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ORIGINAL ARTICLES.

THE TREATMENT OF HYDROPHOBIA, HISTORICALLY AND PRACTICALLY CONSIDERED.[1]

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The history of medicine can be traced back, more or less obscurely, to a period about 1200 years before the Christian era to whatever real or fabled healer may have been the foundation of the myth of Aesculapius, yet Aristotle, who lived from 384 to 322 B. C., is the first writer, whose works are extant, by whom we have distinct mention of the subject of hydrophobia. His reference to it has given rise to much discussion, because it does not accord with what is commonly believed about it, but there can be no doubt that he spoke of what is now known by this name. His expression is: "Dogs are subject to three diseases. These are called lyssa, cynanche and podagra. Of these lyssa causes mania, and whatever is bitten (*ὅταν ᾖσκῃ*) all those bitten go mad except man. (*λυττῶσιν ἅπαντα τὰ δηχθέντα πλὴν ἀνθρώπου*).[2] This disease seizes on dogs and whatever is bitten by a mad creature except man."

But we have also references to the sayings of earlier physicians about hydrophobia in the works of those who followed them. Thus we learn from Pliny,[3] that Epicharmus, who is supposed to have died about 450 B. C., not only was familiar with the disorder, but also praised the use of the wild cabbage in its treatment. Following him we find Democritus, who was born about the time that Epicharmus died, speaking of it as an inflammation of the nerves.[4] Eudemus, who lived in the third century B. C., is quoted by Dioscorides[5] as declaring that a certain one had escaped the disorder; while Themison, who lived from 63 B. C., to 25 A. D., is said to have contracted the disorder while attending a friend, and to have escaped only after great suffering.[6]

However, the first account of hydrophobia in man which corresponds to the ideas of modern times is that given by Celsus, who speaks briefly but appreciatively of its horrors, calling it "miserimum genus morbi," and gives some excellent advice in regard to its treatment. He advised cupping the wound, cauterizing it—if it be not in a nervous or muscular part—and the use of emollient dressings. If the actual cautery cannot be applied, he says, "bloodletting is not unsuitable." When the symptom of a dread of water was fully developed, he declared the only remedy was to cast the unsuspecting patient into a pond, where, if he could not swim, he was now to be allowed to sink, and thus compelled to drink and again lifted up; while, if he could swim, he was to be pushed under again and again, until, even against his will, he was filled with water. For the shock which might result, he advised placing the patient afterward in a bath of warm oil.

This heroic method is said by Dr. Arnold[7] not to have been original with Celsus, but copied from some of the older physicians—an assertion which seems reasonable in view of certain expressions of Cælius Aurelianus.

Not long after the time of Celsus, Pliny the Elder (b. 23 A. D.—d. 79 A. D.) published his famous Natural History, already referred to, in which he seems to have collated, with the utmost impartiality, all the reasonable and unreasonable ideas of his time in regard to a great variety of subjects. Among these, those about hydrophobia are not the least interesting, nor the most absurd. To the wound made by the bite of a mad dog, he suggests the application of raw veal. Some, he says, prefer (as a preventive of the hydrophobia) a he-goat's liver, or a she-goat's dung, with wine, or the dung of the badger, cuckoo and swallow, boiled and taken in drink. (Book xxviii, 43.) The ashes of river-crabs, he says, are good when the symptoms of the disorder appear. (Book xxxii, 19.) He praises, also, the ashes of the tail of a shrew-mouse, if the animal has survived and been set at liberty; a clod from a swallow's nest, applied with vinegar; the young of a swallow reduced to ashes; or the skin or old slough of a serpent that has

[1] For bibliography of the subject, see paper on "The Disorders Mistaken for Hydrophobia" in Transactions of the Medical Society of the State of Pennsylvania, for 1884.

[2] Aristotelis Opera Omnia quæ extant. Græcè et Latinè. Authore Gulielmo Du Val. 2 vols., folio. Lutitiæ Parisiorum, 1629. Historia Animalium, lib. viii., cap 22.

[3] Pliny; Caius Plinius Secundus. Natural History. Translated by Bostock & Riley. 6 vols. 12mo. London. 1855. Chapter xx.

[4] Aromatarius, Josephus de. Disputatio de rabie contagiosa. 8vo. pp. 96. Venetiis, 1625. Pas I, particula 9, p. 12.

[5] Pedannii Dioscorides Anarzarbei de Materia Medica Libri V. 2 vols. 8vo. Lipsiæ, 1829, 1830. Vol. ii, p. 59.

[6] Dioscorides, loc. cit.

As the passage referred to is sometimes misunderstood, I will give it here in full. "Sed unicum tamen remedium est, nec opinantem in piscinam non antè ei prouisam proijcere, et si natandi scientiam non habet, modò mersum bibere pati, modò attollere: si habet, interdum deprimere, ut inuitus quoque aqua satietur. Sic enim simul sitis, aquæ metus tollitur." Celsus, Aurel. Corn. De Arte Medica libri octo Basiliæ, 1552. Lib. V. Cap. XXVII.

[7] Arnold, Thomas, M.D. A Case of Hydrophobia. 8vo., pp. 245. London, 1793. P. 193.

been cast in the spring, beaten up with a male crab in wine. There is, he says, beneath the tongue of a mad dog a certain slimy spittle, which, taken in drink, is a preventive of hydrophobia; but much the most useful plan is to take the liver of the dog that has inflicted the injury, and eat it raw, if possible, and if not, cooked, and taken with the food, as a remedy for this disease. As to the popular idea of the nature of hydrophobia at that time we may gather something from the statement that "So virulent is the poison of the mad dog, that its very urine even, if trod upon, is injurious, more particularly if the person has any ulcerous sores about him." (Book xxix, chap. 32.)

Scribonius Largus, who flourished at about the same time as Pliny, cites a number of antidotes then in use.†

In the first century of the Christian era flourished also Dioscorides, who treats very fully of the effects of venomous bites and of mad dogs. He recommends for the bites of the latter the methods common to them and the former, and follows these with the administration of the ashes of river-crabs, burnt with a fire made of the twigs of white clematis, together with powdered gentian root. The most effectual remedy, he says, is hellebore; but even this will not avail after the symptoms of hydrophobia are fully developed.[1]

The next writer who attracts the attention of the inquirer is Galen, who lived from 131–200 A. D. His recommendations are scattered through his extensive writings. There is little original in them. He specifies, after the teaching of his preceptor Aeschrion, that the ashes of river-crabs, intended as a preventive of the hydrophobia, should be prepared by burning on a copper plate, in summer, after the rising of the dog-star, when the sun is in Leo.[2] Contrary to what one might suppose from some of the histories of hydrophobia, Galen was sceptical as to the advantage of eating the liver of the mad dog. He says he has seen some who, after doing this, had got well; but, he distinctly states that they had also used other means considered useful in such cases, and that he had also seen others trusting in the liver of the dog alone, who had lost their lives.[3]

In the next century (about 230 A. D.) lived Cælius Aurelianus, who is one of the most interesting characters in the history of hydrophobia. He is the first author, whose works are extant, to give a systematic account of this disorder. But he treats of it so fully that we are able to judge pretty well just what was the general state of information in regard to it up to his time. He discusses the causes, nature, symptoms, simulations, lesions, and treatment of hydrophobia in an orderly and intelligent manner, although he was not free from some of the current errors of his time, and wrote most atrocious Latin. In speaking of treatment, he recommends bleeding, to subdue fever, if any be present, and, if not, to subdue the fear. He advises that when this is done the patient be made to turn away his face, and that the blood be caught in the hand, in order that its flow may not agitate the patient. He condemns in a most intelligent way the follies and superstitions which many of his predecessors had taught.[1]

Aetius, who lived about 543 A. D., advised the administration of oxalis, and speaks of the eating of the liver of the cormorant—the virtue of which, he suggests, may depend upon the fact that patients must go to sea to get it. He also mentions the flesh of the sea-horse, the blood of its young, which creates a great thirst for water, taken internally. He also speaks of the skin of the bear, seal or hyena, applied to the skin as an amulet, and the skin of the hyena reduced to ashes and swallowed.[2]

Paul, of Ægina, who lived either at that time, or in the century following, speaks of the treatment of hydrophobia by the administration of the herb alysson, the liver of the mad-dog, the blood of a partridge, garlic, and onions. He concludes his chapter on this subject with the statement that the most effective treatment is helleborism.[3]

Of Rhazes (860–940 A. D.), Avicenna (980–1036 A. D.), Albertus Magnus (1193–1280 A. D.), Cardan (1501–1576 A. D.), Matthiolus (1501–1577 A. D.), though their names are associated with the history of hydrophobia, there is little worth mentioning when speaking of its treatment.

Ambroise Paré (1509–1590 A. D.), who entertained many of the erroneous notions of his time in regard to the nature and symptoms of hydrophobia, both in dogs and men, advised the use of antimony, with cathartics and sudorifics, good eating, moderate drinking, and the avoidance of sleep. For the treatment of the wound he followed the lead of Aetius in recommending the oxalis to be bruised and applied, and a decoction of it to be taken internally. He also advised the use of mustard dissolved in urine or vinegar, made into a lotion to be rubbed in and laid upon the wound on a double cloth; and finally, he says, all acrid, pungent and strongly drawing substances are useful.[4]

Palmarius (1520–1588 A. D.), published a receipt for a powder, which he said he had received from Sylvanus Count de Pyrou, composed of a number of vegetable substances, and which was in use so late as the middle of this century. (Lipscomb[5] and Bouchardat.[6]) According to Sauvages he first suggested the use of mercurial frictions, in 1578.[7]

†Scribonii Largi de Compositione Medicamentorum Liber. Cap. 45 and 46. (Stephanus: Medicæ Artis Principes.) Folio, 1567.

[1]Dioscorides. Op. cit. P. 59.

[2]Claudii Galeni Opera Omnia. Ed. D. Carolus Gottlob Kühn. 21 vols. 8vo. Lipsiæ, 1821–1830. Vol. XII, Book XI, Chap. XXXIV.

[3]Loc. cit. chap. 10.

[1]Cælii Aureliani de morbis acutis et chronicis libri octo. Amstelædami, 1722. 4to. pp. 32,728. Ed. Jo. Conradus Amman. Cap. xvi. "Quomodo curandi sunt hydrophobi."

[2]Aetii Medici Græci contractæ ex veteribus medicinæ tetrabiblos. Per Janum Conarium Latinè conscripti. Stephanus pub. 1567.

[3]*Παννου Ατγινηιου.* Lib. VII, 4to, 139 leaves. Aldus, 1528. 5th Book, Chap. 3. *Περὶ λυσσωδήκτων καὶ τοῦ ὑδροφοβικοῦ πάθους.*

[4]Ambrosii Parei Opera. Folio. Parisiis, 1572. Lib. xx, De venenis deque rabiosorum canum, venenatorum animantium morsu ac puncturis.

[5]Lipscomb, George, M.D., the History of Canine Madness and Hydrophobia. 8vo. pp. xiii, 211. London: 1809.

[6]Bouchardat, Bul. de l'Ac. de Méd., 21st Sept., 1852.

[7]Sauvages, Francois Boissier de: Oeuvres diverses, 2 vols. 16mo. Paris: 1771. Tome II, Dissert. sur la rage, p. 112.

Schenckius (1530–1598 A. D.), Platerus (1536–1614 A. D.), Fabricius Hildanus (1560–1614 A. D.), and Zacutus Lusitanus (1575–1642 A. D.), though also identified in other respects with the history of hydrophobia, have not contributed anything of special interest to its therapeutics.

Van Helmont (1577–1644 A. D.), recommended the cold bath, or rather what had come to take the place of this recommendation of Celsus, namely, ducking in the sea. He tells an interesting story of a cure he witnessed. "There is," he says, "a Fortress on the sea-coast, about four leagues from Ghent, called Sluce. There I saw a ship passing by, and in it an old man, naked, bound and weights fastened to his feet. Under his arms they had tied a rope, the other end of which was fixed to the yard-arm of the vessel. I asked the meaning of this spectacle, and was answered by one of the sailors that the old man had got the hydrophobia, having, some time ago, been bit by a mad dog. Why, I asked, is he brought to the sea? whether they meant to drown him? No, no, (said the sailor), he will soon be cured; such is the blessing of God upon the sea that it will instantly cure this kind of madness. At my request they took me on board. We had scarce sailed a mile when the sailors, by pulling out a plug in the bottom of the ship, let in the water till she sunk almost to the edge of the gunwale. This sea-water they collected for the purpose of making salt. The plug being now readapted, two men hauled down the opposite end of the yard, and thus hoisted the old man into the air. They then let him drop into the sea, and he remained under water *ad spatium Miserere*. They repeated this operation twice more, keeping him each time under water *ad spatium salutationis Angelicæ*. They then laid him on his back across a barrel, and covered him with a watch-coat. I concluded he was dead; but the sailors ridiculed my apprehensions. Being now released from his bonds he discharged all the water which he had inspired, and presently revived. He was a cooper from Ghent, and being cured of hydrophobia, continued perfectly well." [1]

In 1625 Aromatarius, a physician of Italy, published a most interesting monograph on hydrophobia, which he held to be a contagious angina. With this in view, he recommended the practice of laryngotomy.[2] The first proposal of this method for the treatment of hydrophobia he attributes to Asclepiades, on the authority of Cælius Aurelianus, who, he says mentions and condemns it. In this, however, Aromatarius was mistaken, for both of these authors spoke of laryngotomy only in connection with indubitable cynanche,[3] and the credit of its suggestion for the treatment of what is taken to be hydrophobia is entirely due to Aromatarius, and not at all to these ancient men.

In 1656 Salius Diversus published a book on pestilential fever, in which he treats of the hydrophobia, in a way that is intelligent to a degree quite remarkable for his times. He had little faith in the modes of treatment proposed, and thought the cases of reported cure must have been of incipient, and not fully developed hydrophobia.[1]

Bœrhaave (1668–1738), though saying that little confidence could be placed in preventive treatment, advised free and deep scarification of the wound made by a mad dog, followed by cupping and the actual cautery. After this the wound was to be kept open and suppurating. After infection of the system he recommended casting in a river or the sea, with great display, so as to make a strong mental impression. At the outbreak of the disorder he advised bleeding "ad deliquum," and to bind the eyes and cast into a cold pond.[2]

Ravelly,[3] in 1696, recommended the use of emetics, diaphoretics, diuretics and purgatives. He says that everyone knows that the best plan is to plunge the patient several times into the sea. He first recommended the use of mercury internally, and praises the virtues of camphor even still more highly. His most remarkable recommendation, I have been surprised not to see in any of the monographs on hydrophobia which I have read. This is the transfusion of the arterial blood of some animal into the veins of the sufferer. For this purpose he says the blood of the he-goat is the best, and explains why.

In 1698 Mr. George Dampier communicated to Dr. (afterwards Sir) Hans Sloane—who then gave it to the public[4]—the composition of a secret remedy, the Lichen cinereus terrestris, or grey ground-wort, which became afterwards a part of the Pulvis antilyssus, long famous and much esteemed in England.

This remedy was subsequently introduced to the general public by Sir Hans Sloane in a brief pamphlet which treats of disorders of the eyes, and to which this is a mere addendum.[5]

This pamphlet was in 1767 translated into French, and its value much enhanced by M. Cantwel.[6]

About this time (1700) Sir Theodore Mayern proposed to the British public the following interesting procedure, which was calculated not only to serve as a test of the state of a dog suspected to be mad, but also as a curative method, in case it was: "Pluck the *Feathers* from the *Breech* of an old *Cock*, and apply it bare to the *Bite*, and do this upon each of the *Wounds*. If the *Dog* were *Mad*, the *Cock* will *Swell* and *Die*, and the Person *Bitten* will do well; but if the *Cock Dies* not, the *Dog* was not *Mad*. If

[1] Berkenhout, John, M.D., an Essay on the Bite of a Mad Dog. 8vo. pp. 63. London, 1783. Pp. 58–61.

[2] Aromatarius, Op. cit., p. 85.

[3] Cælius Aurelianus, Op. cit. Lib. iii, cap. iv. P. 195.

[1] Petri Salii Diversi de febre pestilenti tractatus, etc. 16mo., pp. 523. Hardevici, 1656. Lib. de Affectibus part., Cap. xix, De rabie., pp. 341–377.

[2] Bœrhaave, Hermanni, Libellus de materia medica, et remediorum formulis, quæ serviunt aphorismis de cognoscendis et curandis morbis. 16mo., pp. 184, 349, etc. Lugdun. Batavorum, 1727. Aph. 1143–1147.

[3] Ravelly, J. Traité de la maladie de la rage. Small 12mo., pp. 192. Metz, 1696. Pp. 136, 172, 174, 183.

[4] Dampier, Mr. Geo. On the cure of the bitings of mad creatures, with a remark on the same by Hans Sloane, M.D. Philosophical Transactions for 1698, No. 237. Ed. 1809, vol. iv, p. 232.

[5] Sloane, Sir Hans, Bart. An account of a most efficacious medicine for soreness, weakness, and several other distempers of the eyes. Small 8vo., pp. vi, 17. London, 1745.

[6] Histoire d'un remède trés efficace pour la foiblesse et rougeur des yeux et autres maladies du même organe. Avec un remède infallible contre la morsure du chien enragé. Par le Chevalier Hans Sloane, etc. Traduit de l'Anglais et enrichie de notes par M. Cantwel. Small 8vo., pp 27. A Amsterdam et à Leipzik, 1767.

the *Wounds* be very small, it is requisite to open them with a Lancet."[1]

We now come to the time of the great Dr. Mead, (1673–1754 A. D.) who in his various writings, has had a great deal to say about hydrophobia. His notions bear in part the impress of the opinions of his times, and more conspicuously the marks of his own original and fanciful notions in regard to pathology, and the influence of the heavenly bodies on the human frame.[2] In regard to the treatment of hydrophobia, he is most noted for having devised the pulvis antilyssus, which was at first composed of equal parts of the lichen cinereus terrestris and piper niger, but afterwards, as Dr. Mead says, on account of its too great heat in this shape, of only half as much of the pepper. This powder was in 1721 inserted in the London Pharmacopœia, and for many years not only held the confidence of the English medical men, but was also much used in foreign lands. Mead says he had seen the liver of the dog eaten in his time, but without success. In his first medical publication he stated that "The greatest and surest Cure of all, is frequent Submerging or Ducking the Patient in Water."[3] After his composition of the pulvis antilyssus he spoke of this as a "sure cure."[4]

About this time Desault[5] (1732) published his interesting book on the venereal and other diseases, in which he recommends, as a specific, inunctions of an ointment he calls "Neapolitan," composed of equal parts of human fat, hog's lard and mercury. As a concession to the prejudices of his time he permitted also dipping in the sea, the wearing of amulets, religious rites and various diversions. Desault's practice was founded upon the theory that hydrophobia was communicated by the transfer and breeding of certain "insects or little worms," herein being analagous, he said, to the "Venereal Distemper."

In England, Dr. James (1703–1776) next attracts our attention in connection with the treatment of hydrophobia. This is the Dr. James whose fever powder was so long in use all over the world. He is said to have been—and, so far as I can learn, was—the first to suggest in England the use of mercurials for hydrophobia. This suggestion, though it had been made nearly 200 years before by Palmarius, as we have seen, seems to have appeared new to Dr. James, and was the outcome of some investigations in regard to the effect of mercury on dogs, which he reported to the Philosophical Society,[6] in 1735. His suggestion was to give the Turpeth mineral internally and to use inunctions, in the manner which had shortly before been proposed by Desault. He had some faith in the *pulvis antilyssus*, and also in what was known as the Tonquin medicine, a remedy brought from Tonquin by Sir George Cobb, which was composed of musk with native and factitious cinnabar.[1]

About this time also appeared the famous composition of one Hill, an apothecary at Ormskirk, which has since been known as the Ormskirk remedy. This was made of chalk, Armenian bole, alum, elecampane root and oil of anise. This too had a great reputation in its day.

At this time too the use of belladonna was begun in Germany.[2]

As late as 1753, I find that Andree had a case where he found his patient had been made to eat the cooked liver of the dog which had bitten him. Andree himself approved of Desault's method, and used it.[3]

Dr. Robert Whytt (1714–1766 A.D.) recommended the use of opium in large doses, upon the theory that "the hydrophobia is only a violent convulsion of the gullet and stomach, etc., arising from the disagreeable sensation excited by any liquid touching the fauces, or by the effort the patient makes to swallow them."[4]

This recommendation of Whytt has found its most heroic following in the practice of Babington, who gave a patient within twelve hours 180 grains of opium, besides giving him a hot bath, blistering and bleeding him, and using an inunction of strong mercurial ointment, The patient—which is hardly remarkable—died in 15 hours.[5]

In 1784, one of the most astonishing suggestions in regard to the treatment of hydrophobia was made by M. de Mattheis, Surgeon in the army of the King of Naples. Seeing one day a dog supposed to be mad, and which had a convulsion when water was offered to it, he applied to its throat a viper, and excited the latter to bite. At once, he says, the dog's head swelled up, the hydrophobia ceased, and the animal recovered.[6] Soon after, in 1788, Fabbroni reported a case[7] where the same treatment, with the modification that there were two vipers employed, which were applied one to each leg, was used upon a man. The patient seemed to be relieved for a moment, but he died in half an hour.

In 1789, Dr. Percival suggested the application of fresh gastric juice, or the saliva of a healthy young person, obtained by chewing rennet, to the bite of a mad dog, after the wound had been thoroughly washed in the manner recommended by Dr. Haygarth. He also gave an interesting account taken

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[1] Mayern, Sir Theodore. Several Receipts for the Bite of a Mad Dog. Philos. Trans. 2d ed., by Lowthorp, 4to, London, 1716, vol. iii, pp. 283–284.

[2] Mead, Richard. De imperio Solis ac Lunæ. 8vo, pp. xvi, 123, Londini, 1746.

[3] The Same. A mechanical account of poisons. 8vo., pp. 184. London, 1702.

[4] The Same The medical works of. A new edition. 8vo, pp. 511, Edinburgh, 1775. Art. "Of the mad dog." Pp. 56–72.

[5] Desault, Pierre, M.D. A Treatise on the Venereal Distemper, etc., with Two Dissertations; the first on Madness from the Bite of Mad Creatures; the second on Consumptions. Translated from the French by John Andree, M.D. 8vo, pp. 16, 332. London, 1738. Pp. 195–271.

[6] James, Dr. Robert, Some experiments made on mad dogs with mercury. Dated Litchfield, June 3, 1735. Philos. Trans. for 1736, No. 441, London, 1809, vol. vii. pp. 69–73.

[1] James, R., M.D., a new method of preventing and curing the madness caused by the bite of a mad dog. 8vo, p. 40, London, 1743.
Ibid. A treatise on canine madness. 8vo. vols. vi. pp. 264, London, 1760.

[2] Lettsom, J. C., Appendix to Mease: "An essay on the disease produced by the bite of a mad dog. 8vo. pp. xvi., 179, Philadelphia and London, 1793.

[3] Andree, John, M.D., Cases of epilepsy, hysteria, fits, etc... To which are added cases of the bite of a mad dog. 2nd ed. 8vo., pp. 298, London, 1753.

[4] Whytt, Robert, The works of, published by his son. 4to, Edinburgh, 1768. On the nature, cause and cure of nervous diseases. Pp. 679–680.

[5] Babington, Dr., Two cases of rabies canina, etc. Medical Records and Researches. London, 1798. Pp. 117–154.

[6] Mattheis, M. de, Apergu sur les moyens de guérir l'hydrophobie. 8vo, Paris, 1784. Reviewed in *London Med. Jour.* vol. v., 1785, p. 220.

[7] Fabbroni, J., report of a case where vipers were applied for a hydrophobia. *London Med. Jour.*, vol. ix., 1788, p. 69.
Percival Thomas. Essays. 4th ed., 2 vols., 8vo. Warrington, 1789. Vol. ii. Essay X., p. 363–384.

from Abbé Grosier's "Description of the Chinese," of a species of porous stone, used in "Tang-King," and called a "Serpent-stone." This stone was applied to the wounds of serpents and mad dogs, whereupon it adhered, drew to itself the virus, dropped off, and the patient was saved. This stone, after washing in lime water and drying, could be used over and over again. This is the earliest allusion to the so-called "mad-stone," which I have found.

The next reference to the "mad-stone" which I have found is contained in an unpublished letter to Dr. Rush from a Mr. Samuel Davis of Petersburg, Virginia, dated Oct. 2, 1801. In this the writer tells of his endeavors to avert the hydrophobia from a son who had been bitten by a suspected dog. The boy, after some domestic applications, was, by the advice of a physician, cauterized and blistered almost down to the bone of his arm. He was then almost wild, and was taken to a person reputed to have a "mad-stone." With the performance of this stone the father was not satisfied, because, contrary to his expectation, and the popular belief about such stones, he could see no evidence of the poison boiling out of it after its removal. He therefore took his son to a second person owning a "mad-stone." The application of this he graphically describes, and his seeing, after it had remained on for periods of twelve hours and was taken off and put into water, some bubbles arise from one corner of it, which the owner of the stone told him was the poison coming out. An investigation of the history of this stone—for which the owner said he had refused an offer of 300 guineas—revealed the fact that it had been given by a stranger who had been hospitably cared for when sick. It was wrapped in a piece of paper dated Charleston, South Carolina, 1740, and having printed on it the following: "Francis Torres a native of France is in possession of a chymical preparation, called a Chinese snake stone, which will extract the poison of the bite of snakes, spiders, and of a mad dog, and will cure cancers, which are sold at half a guinea for the small and a guinea for the large ones."*

We have now come to the beginning of the present century, a time when the prevailing method of treating hydrophobia was with bleeding and mercury. The most instructive writer on the subject of hydrophobia about this time was Mease, who, in 1792, published an inaugural dissertation, on taking the degree of Doctor of Medicine in the University of Pennsylvania, which is one of the most valuable publications on the subject which have appeared in any time. His studies, then[1] and afterward,[2] led him to dissent from the view of Dr. Rush that hydrophobia was a malignant fever, and to oppose blood-letting; while he thought as well of mercurials as of anything.

Dr. Rush, on the other hand, at first believed that hydrophobia was a malignant fever—an opinion which, though incorrect, was not novel, for, long before, Eustachius Rudius had called it "*a putrida maligna humiditate caput petente morbum.*"[1] Dr. Rush, thinking as he did of the nature of the disorder recommended free blood-letting, saying: "The loss of 100-200 ounces of blood will probably be necessary in most cases to effect a cure."[2] In 1811 I find he made the following endorsement on the back of a letter from Dr. A. C. Peyton, of Virginia[3] (who wrote in great anxiety because he had had his hand scratched by the teeth of a mad steer, to which he was administering medicine):

"May 31, answered his questions—

"1. No animals communicate the hydrophobia but dogs, cats and foxes.

"2. Cutting out the wounded part at any time before the disease comes on, prevents it.

"3. The wound should be kept open 4 or 6 weeks.

"4. There is no medicine taken internally that prevents the disease."

Later still he came to the opinion that hydrophobia was essentially a spasmodic disorder of the larynx, and recommended laryngotomy.[4]

This last proposal of Dr. Rush was a modification of that made by his friend Dr. Physick, who, after observing a single case, concluded that the trouble was due to a spasm of the glottis, and, in 1802, advocated the performance of tracheotomy.[5] We have here another interesting illustration of how history is unwittingly repeated; for, as we have seen, this operation had been recommended for employment in hydrophobia by Aromatarius, about two hundred years before, while—though in this he was mistaken—he had attributed the first suggestion of it to Asclepiades, before the Christian era.

About the beginning of this century galvanism, which had nearly 40 years before been used in the treatment of tetanus,[6] was used by Rossi with entire success in a case he considered to be one of hydrophobia. In the very dramatic report of a case which was given by Vassali-Eandi to the Academy of Sciences of Turin, it is stated that Rossi, having extemporized a galvanic battery, made his patient stand barefooted on sheets of coarse, wet paper connected with one pole, and thrust a conductor, connected with the other, into his mouth *whenever he opened it to bite!* In this manner shocks were repeated until the patient was unable to stand, and was covered with beads of sweat. The next day he came back and reported himself cured, and, notwithstanding the solicitations of the

*For this interesting story I am indebted to the kindly interest of Dr. Samuel Lewis, President of the College of Physicians of Philadelphia, who secured for me access to the rich collection of unpublished correspondence of Dr. Rush, which is preserved in the Ridgway Branch of the Philadelphia Library.

[1]Mease, James, On the disease produced by the bite of a mad dog or other rabid animal. 8vo, pp. v, 131, Philadelphia, 1792.

[2]The same. Observations on the arguments of Professor Rush in favor of the inflammatory nature of the disease produced by the bite of a mad dog. 8vo., pp. 62, Philadelphia, 1801.

[1]Aromatarius. Op. cit., p. 27.

[2]Rush, Benjamin. Medical Inquiries and Observations. 2d ed. Philadelphia, 1805, vol. ii, p. 317.

[3]Unpublished correspondence of Dr. Rush, before referred to.

[4]Rush, op cit., 5th ed. Philadelphia, 1818. Vol. ii., pp. 193–211.

[5]Physick, Philip Syng; A case of hydrophobia. *Medical Repository*, vol. v., 1802, P. 1–5

[6]Watson, Wm., M.D., Effects of Electricity Applied to a Tetanus. Philos. Trans. for 1763. 4to, London, 1764, pp. 10–26. Also, Spry, Dr. Edward. Account of a Locked Jaw and Paralysis Cured by Electricity. Philos. Trans. for 1767, 4to, London, 1768, pp. 88–91.

enthusiastic operator, declined to undergo a repetition of the treatment.[1]

Delabere Blaine, who is regarded as the pioneer of intelligent veterinary medicine in England, and who corrected a number of popular errors about rabies in dogs which had prevailed up to this time, believed he had been saved from hydrophobia by a nostrum, and declared that excision was as effectual at the end of the first, second or third week as at the first.[2]

Youatt, the veterinarian, who built his ideas, to a considerable extent, on those of Blaine, had a most extravagant faith in the cauterization of the bites of mad dogs with the nitrate of silver, and advised its use even after the constitution has been affected.[3]

Dr. Parry, who was one of the most intelligent writers on the subject of hydrophobia, and whose interest in the subject extended over a period of nearly 40 years, despaired of curing the disorder when once it was fairly developed, but advised even late excision of the cicatrix and its immediate surrounding tissue as a preventive measure.[4]

In 1820, Marochetti, an Italian surgeon, announced that he had learned, in 1813, from a Cossack peasant in the Ukraine, that there were, in cases of impending hydrophobia, certain vesicles beneath the tongue, (which are known in history as "lyssi") the excision of which would prevent the outbreak of the disorder.[5]

This so-called discovery has been robbed of its novelty by an excellent report of Auzias-Turenne to the French Academie de Médecine,[6] in which it is shown that the lyssi were explicitly indicated by Pliny, Demetrius, Pepagomenus and Fracastor; that they were known by tradition in Greece, Turkey, Spain, and Galicia.

The practical value of the theory of the lyssi has long been known to be *nil*, although even such recent writers as Trousseau[7] and Doléris[8] have given them credit, and the latter has accepted a story of the inoculation of the contents of them, so as to produce an artificial rabies in horses.

About this time Urban propounded the theory that the virus of hydrophobia is at first deposited in the immediate neighborhood of the wound, and it is followed by the development of certain vesicles which contain the virus and have inoculable contents, like the "lyssi." He recommended bathing the wound with acidulated, warm milk, applying cups, and then salt solutions. The vesicles were to be carefully looked for, and, if they appeared, they were to be opened and treated like the original wound.[9] He enforced these recommendations by citing a number of cases where he had, according to his own statement, saved his patients' lives in this way.

In 1821, Magendie proposed and experimented on a dog with intravenous injections of warm water. Afterward he treated a man who had symptoms like those of hydrophobia after strong emotional excitement, with an intravenous injection of two pounds of warm water, he having been well bled several times before. The result was a temporary calm, followed in two days by hæmorrhage from the bowel, then by abscess of the leg, and death on the ninth day. Magendie's theory was to produce an artificial aqueous plethora, to enfeeble the functions, and especially the nervous system. The dog he experimented on died as well as the man.[1]

This method was also tried successfully by Gaspard, in 1824.[2]

In 1831 Trousseau, at the recommendation of Magendie, gave to a patient of Recamier's, whose *interne* he was at the hospital at that time, what was supposed to be 36 drops of officinal hydrocyanic acid. The patient, a young man, fell at once, as if dead. It was then learned that the drug clerk had made a mistake, and sent Prussic acid instead of what was ordered. Trousseau thought, of course, that the patient was killed; but, strange to say, his symptoms were somewhat relieved, and he was given several smaller doses afterward. He died, however, within twenty-four hours.[3]

Let us now advance our review of former methods of treatment of hydrophobia, at the cost of omitting some that are curious, but none that have proved efficient, to the year 1852, when Bouchardat[4] made a report to the French Academy of Medicine, at the request of the government, upon a large number of proposals sent in just before that time for the cure of hydrophobia. This report contains, among other curiosities, the composition of a famous cabalistic omelette, made up of the lower shells of male oysters, powdered, with eggs and oil. One of the proposals—which came from a "Chocolatier" of Thernes—was to inoculate the patient with the virus of small-pox. The proposer claimed that he had treated and cured more than twenty persons in this way. A certain M. Vau proposed that the patient should be choked and thrown on a very hot brazier, so as to be well burned. After this he was to be cast into the water, "to extinguish him, and to counterbalance the two electro-magnetic currents." The "Countess of Saparta" wrote that she had observed that when she squeezed the anus of her dogs between her thumb and finger, she pressed out a yellowish fluid. This she did every fifteen days, and her dogs had not gone mad. She asked, therefore, if the virus

[1] The *Medical and Chirurgical Review*, vol. x, London, January, 1804, pp. lxxxix-xci. Also. Thacher, James, M.D. Observations on Hydrophobia. 8vo., pp. 302, Plymouth, Mass., 1812. P. 174.

[2] Delabere Blaine. An Essay on Hydrophobia. Corrected and revised by Dr. James Carver. 8vo., pp. xii, 94. Philadelphia, 1818.

[3] Youatt, William. The Dog, edited by E. J. Lewis, M.D., 8vo., Philadelphia, 1853.

[4] Parry, Calebus Hillier, Tentamen medicum inaugurale de Rabie Contagiosa. 8vo., pp. 102. Edinburgi, 1778.
Ibid. Cases of Tetanus and Rabies Contagiosa. 8vo., London, 1814.

[5] *Journal de Physiologie*, T. v, 1825, pp. 275-318, and *Arch. gén. de Médicine*, T. IX, 1825, pp. 80-99 and 247-257.

[6] Auzias-Turenne, Apercu historique et philosophique sur les lysses ou vesicules de la rage. Bul. de l'Ac. de Méd. T. XXXIV, 1869. Pp. 8-23.

[7] Trousseau. *Clinique Médicale*. Paris, 1865. Tome II., p. 361.

[8] Nouveau Dictionnaire de Méd. et de Chir. Tome XXX, 1881, Art. "*Rage humaine*."

[9] Urban. Review by Sulzer, in *Journal des Progrès*, Paris and Strasbourg, 1827, T. II., pp. 43-54.

[1] Magendie. "Expériences sur la rage." *Journal de Physiologie*, vol. I. Paris, 1821. *Ibid.* "Histoire d'un Hydrophobe, trait à l'Hotel-Dieu de Paris au moyen de l'injection de l'eau dans les veines. *Journ. de Phys.* Tome III, Paris, 1823.

[2] "Expérience sur un homme hydrophobe." *Journal de Physiologie*. Tome IV. Paris, 1824.

[3] Trousseau, A. Clinique Médicale, 2 vols., 8vo. Paris, 1865. Vol. ii, pp. 349, 350.

[4] Bouchardat. "Rapport géneral sur divers remèdes proposés pour prévenir ou pour combattre la rage." *Bul. de l'Acad. de Méd.* Tome XVIII, 1852, pp. 6-30.

of rabies were not in this, and suggested inoculations with it as a preventive.

Bergeron, so recently as 1862, reported a case of a child, 12½ years old, to whom he gave hypodermic doses of $^{1}/_{10}$ grain of atropia.[1]

In 1863 M. de Moerenhaut, formerly Consul at Los Angeles, claimed that hydrophobia originates in pole-cats, and does not exist where these are not found. From the same source where he gathered this information he learned that the application to the wound of chewed confitura leaves, and swallowing the expressed juice, was a preventive of hydrophobia.[2]

To conclude this purely historical part of our study, I will merely mention the use of the Xanthium spinosum, which was proposed as a remedy by G. R. Zymala,[3] or Grzymala,[4] in Russia, about 1866. It was tried experimentally at Alfort, and found unreliable, notwithstanding the extravagant claims of its proposer. Doléris says that this drug was said to have cured 100 cases in Podalie and the south of France in 1876—a statement which he utterly rejects.

That this sketch of the remedies which have been in use in the past is but a sketch, will be appreciated by any one who looks over the list of remedies given by a single author, Saint-Martin,[5] which includes 39 from the mineral kingdom, 213 from the vegetable, 86 from the animal, and 9 compound nostrums. I have not mentioned a large number of charms, rites, and mummeries; to make a complete list of them would make up a volume and waste a life-time. But enough has been exhibited to show how vainly the previous generations have struggled with the strange problem presented by the current theories as to the nature of hydrophobia.

We may now turn to a consideration of the methods of treating hydrophobia which have been recommended in such recent times as to constitute practically the methods of our own day. The most important of these consist in the administration of morphia, chloral, curare, cannabis indica, hoang-nan or pilocarpine, by the mouth or rectum, or hypodermically, inhalations of chloroform, nitrite of amyl or oxygen, and the application of electricity. In discussing these, we must exchange the historical for the critical attitude, and endeavor to determine, as we go along, what claim each method has on the confidence of the world.

Morphia is the natural successor of opium, which, as we have seen, has been long in use. It is easy to understand how it might have been assumed *a priori* that opium, or its active principle, would be useful in the treatment of hydrophobia; but it is hard to understand why its invariable failure to save life should not long ago have led to its being discarded. And here we come upon one of the many paradoxes with which the history of this disorder is full, namely, that the remedies which have been most steadfastly praised and commended, which have held their ground the longest, are the very ones which have oftenest failed. Opium is one of these deceivers. Bleeding was another. We have seen that Dr. Rush advised bleeding to the extent of from 100 to 200 ounces, and no one can claim that the method did not get a fair trial, for its advocates bled often enough and freely enough to satisfy the most exacting. As Dr. Pearson remarked in 1802: "In some of the unsuccessful cases, the quantity of blood drawn was astonishingly great."[1] And Desault cites a case from Clement where twenty pounds of blood were taken from a patient.[2] Yet, in the face of this, the advocates of bleeding urged it again and again, and charged its failure upon the timidity of those who employed it.

The same may be said of the use of mercury. Notwithstanding the fact that for two hundred years it has been tested and found wanting, it has been recommended from writer to writer until even so recent an author as Doléris, in 1881, gives it a sort of side glance of approval. And this is a remedy the use of which was founded upon an assumed similarity between the poison of syphilis and that of hydrophobia, and the belief, as John Douglas bluntly put it, that "that antidote, which most effectually expels the malignant and deadly poison conveyed by the sting in a harlot's tail, must also be the best antidote against the sting of the scorpion, the bite of the viper, rattle-snake, and all the serpents in the East or West Indies."*

I think that of morphia even a more severe condemnation may be formulated. I have studied the details of many cases where it was used, and I cannot recall a single one where it has seemed to have done any real good. But I can recall, from my reading and experience, many cases where I feel sure it has done a great deal of harm, where the opium or morphia has, in my judgment, been largely responsible for the delirious excitement, which has been kept in a flame of fury by the physical surroundings and management of the patient, until it and they have succeeded in parting the soul and body of the poor sufferer they were intended to relieve.

Chloral, I think, is open to the same objections as morphia, although I do not believe it as absolutely pernicious. I have failed to discover any evidence that it is of real value, and I think it is absolutely dangerous in the large doses often recommended. Some of the cases I have studied have left on my mind the impression of an accumulation of the doses given, followed by their absorption all at once, with the effect of sudden heart-failure and collapse.

The use of curare in the treatment of hydrophobia is said by Dolan[3] to have been proposed first by Prof. Sewell early in this century. It was first used in 1861, at Milan, but was not successful. In the next year, I find Bergeron[4] regretting that its scarcity may

[1] Bergeron, Jules. "De la rage." *Arch. gén. de Méd.* 5 sér. T. xix, 1862, pp. 137, 307, 550, et seq.

[2] *Bul. de l'Acad. de Méd.* T. xviii, 1863, pp. 914-919.

[3] Bonjean, Jh. Monographie de la rage. 8vo., pp. 238 Chambéry, 1878. P. 134.

[4] Doléris, op. cit.

[5] Saint-Martin, A. F. C. Monographie sur la rage. 8vo., pp. xxii, 394. Paris, 1826. Pp. 305-318.

[1] Pearson, Richard, M.D., of London. Letter in the *Med. Repository*, vol. v, New York, 1802, pp. 78, 79.

[2] Desault. Op. cit. P. 268.

*James, R. A Treatise on Canine Madness. 8vo, pp. vi, 264. London, 1760. P. 133.

[3] Dolan, Thomas M. Rabies or Hydrophobia. 8vo., pp. viii, 287. London, 1879. P. 167.

[4] Bergeron. De la rage. *Arch. gén. de Méd.*, T. xix, 1862.

prevent its general use as a remedy. Yet it is often thought that it was first used by Offenberg, who, in 1875, published an inaugural dissertation containing an account of a case of supposed cure by its means.[1] In the next year Dr. B. A. Watson, of Jersey City, had a case which, though it lacked the symptoms of spasm of deglutition and inability to drink, he and Prof. Austin Flint concluded—the latter rather hesitatingly, indeed—to be a case of hydrophobia, or rabies canina. Apparently without being aware that curare had ever been used in this disorder, Dr. Watson proposed it, and with Dr. Flint's concurrence, administered it hypodermically, and the patient got well. This has been cited as a case of cure by curare, but this cannot be done unqualifiedly when it is borne in mind that the patient was treated for awhile with strychnia, and for the three most important days of his illness he received large quantities of brandy.[2]

A few other cases of supposed recovery after the use of curare have been reported; but I think they are not to be relied on as indicating that this drug has any curative action in hydrophobia. And there are many objections to curare. The drug is a compound of uncertain composition and unequal strength, and it is often impossible to obtain. In addition to this its effects are calculated to mask, but not to benefit the morbid state which constitutes the hydrophobic condition. Waterton hoped that it might at least produce a calm death; others have, I think, found that this is what it can do at most. Thus, in a case reported in the *Lancet*, Oct. 15, 1881, we find that, after an attempt to chloroform the patient, which had to be discontinued—to quote the exact words of the report:—"One-tenth of a grain of curare (Savory and Moore's gelatine disc) was administered hypodermically at 4:20 P. M. Patient died quietly at 4:30 P. M., asphyxiated."

Cases similar to this, though less striking and conclusive can be found scattered through the medical journals of the past ten or fifteen years, and they have led most students of the therapeutics of hydrophobia to the conclusion that curare is as worthless as any other of the many remedies which have from time to time attracted the attention and deceived the hopes of mankind.

The use of cannabis Indica was, so far as I know, first suggested by Mr. Cæsar Hawkins, in his "Contributions of Pathology and Surgery," vol. i, p. 74.[3] In 1881 Mr. Ruxton, an India surgeon, reported[4] a case of a boy, 5 or 6 years old, whom he supposed he had cured of hydrophobia by five minim doses of the tincture of this drug.

This remedy has one thing in its favor, and that is no small matter, namely, its mildness. The evidence is not sufficient to warrant any strong expression as to its value, but its usefulness in simple mania would seem to indicate that, if not used in toxic doses, it might prove serviceable in hydrophobia also.

The next remedy to which I call your attention is also from the far East. This is the "Hoang-nan." Hoang-nan is a vegetable substance obtained from the strychnos gaultheriana, which was introduced to the French from Tonquin, about five years ago, by a M. E. C. Lesserteur,[1] who claimed, as is not uncommon with those who propose remedies for hydrophobia, that he had used it successfully in a large number of cases. He stated that he had given it in more than 100 cases bitten by rabid dogs, and in none has he known of the appearance of hydrophobia. This remedy has attracted but little attention, although it has been pretty well discussed in France and its effects in the hands of others has not been calculated to justify the hopes of its proposer. The virtue of the remedy—if it can be supposed to have any—depends upon the fact that the hoang-nan contains strychnine and brucine. A case which ended in recovery was reported by M. Barthélemy last year.[2]

But this remedy has entirely failed to gain a foothold even in France, where, as has been said, it was pretty well discussed about two years ago, and has been hardly noticed, and, I think, never used anywhere else, unless we believe the stories of its extensive employment in the East, of which I have seen no trustworthy evidence.

Within the last few years jaborandi, or its active principle, pilocarpine, has been highly vaunted for the treatment of hydrophobia, and a certain number of cases of supposed cure by its use have been reported. But they will not bear sifting. One of the most notorious of these was reported to the French Academy of Medicine, by M. Denis-Dumont, in 1882.[3] This case was so circumstantially narrated, and seemed so conclusive, that it was cited by a large number of foreign journals as an actual cure of hydrophobia by the treatment employed. But unfortunately for the credit of the remedy, the case was referred by the Academy to a commission, consisting of Mm. Bouley, Bergéron and Leon LæFort. This commission, in an elaborate report, presented by M. Bouley, declared that it was not a case of hydrophobia at all.[4] In addition to this negative opinion, there is, in the same volume, where the case is reported, a letter from a M. Victor Chatel,[5] who was familiar with the history of the case, and there can be no doubt from what he says that the patient, being a hard drinker, was suffering only from the effects of alcohol and the rough handling of the people who first had charge of him, one of the proceedings of whom was to tie the man to a tree.

The conclusion which Germain-See[6] and Dujardin-Beaumetz,[7] came to, and which M. Barthelémy has stated in his paper on Hoang-nan,[8] in regard to jaborandi and pilocarpine, is, I believe, the correct one,

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[1] *New York Medical Record*, March 18, 1876, P. 188.

[2] Watson, B. A., M.D. A supposed case of rabies canina. *Amer. Journal of the Med Sciences*, July, 1876. Pp. 80–91.

[3] Nourse Mr. Letters in the *British Medical Journal*, Dec 3 and 31, 1881. Pp. 923, 1076.

[4] *British Medical Journal*, Nov. 19, 1881.

[1] Lesserteur. Le Hoang-nan, Paris, 1879. This book, mentioned by Barthélemy, I have not seen.
Dujardin-Beaumetz, M. Bul. de l'Acad. de. med. 1882. P. 103, 743–748.

[2] Barthélemy. Le Hoang-nan et la rage. Bul. gén. de Thérapeutique, 1883, T. cv, pp. 147–160.

[3] Bul. de l'Acad., 13 Juin, 1882. P. 696.

[4] Bul. de l'Ac. de Méd., 27 Juin, 1882.

[5] Bul. de l'Ac. de Med., p. 760. 1882.

[6] Bul. de l'Ac. de Med., 1882, p. 713.

[7] Bul. de l'Ac. de Med., 1882, p. 718,

[8] Bul. gen. de thérap., 1883, T. cv, pp. 147–160.

namely, that they rather aggravate than ameliorate the disorder.

It is not worth while to more than refer to certain other remedies which have been used of late, but which have no claim upon the serious attention of the present day. Among these are valdivine, (the active principle of the Picrolemma valdivia), hyoscyamine, codeia, false angustura, pelletiérine, arsenic, arsenite of strychnia, the bromide of camphor, ammonium, calabar bean.

The remedies administered by inhalation are chloroform, nitrite of amyl and oxygen. Nitrous oxide gas has also been used.

The inhalation of chloroform was first proposed and used by Dr. Henry Hartshorne, of Philadelphia, in 1848. But it has not been found of any real merit. Doléris thinks it is absolutely injurious. It has seemed to me that its use, in conjunction with a hypodermic injection of morphia, in the manner known as a mixed narcosis, as proposed in 1877, by Nussbaum, might prove useful, even though neither of these remedies ought to be used alone.

The use of nitrite of amyl was first suggested by Dr. W. S. Forbes in a paper read before the College of Physicians of Philadelphia, April 7, 1875,[1] and was first employed by him in 1877.[2]

This method has been imitated in a few cases, but it has thus far shown no curative value whatever, and has not received the indorsement of any well-known writer on hydrophobia.

The inhalation of oxygen for the treatment of hydrophobia was first practiced by Drs. Schmidt and Zebeden, in Russia, in, or about, 1879. The patient was made to inhale three cubic feet of the gas, whereupon the paroxysms came to an end. The next day they recurred, and the inhalation was repeated, and continued for forty-five minutes. After this the patient recovered. The reference[3] which I have in regard to this case leaves much to be desired on the score of completeness. But the hope that inhalation of oxygen might quiet the paroxysms of hydrophobia seems to get some support from the assertion of Dr. B. W. Richardson that oxygen has a distinct antispasmodic influence, though his inference, after seeing a case of tetanus treated in this way by Sir James Paget, that the profuse sweat in which the patient was bathed, indicated a special eliminative action upon the materies morbi,[4] must be regarded as rather fanciful. As long ago as the year 1830, however, this matter of the possible utility of the inhalation of oxygen for the treatment of hydrophobia, was carefully considered by Dr. Murray, who came to the conclusion that no help was to be expected from it.[5]

Nor is the use of electricity, which has been recently reintroduced to the notice of the profession, so novel a thing as we might suppose. As we have elsewhere seen, this was first used near the beginning of the century. But it has been resorted to again quite of late in France, and Doléris, writing in 1881, says it has been reported to have effected cures in five or six cases in Italy, and, while he admits that on more extended trial it has failed, yet he claims that recently reported cases indicate that it effects in a rapid and durable manner the diminution, if not the entire disappearance, of the paroxysms. Unfortunately, I can not find any confirmation of this hopeful statement. The last case I am aware of, which was treated in this way, was a patient of M. Germain Sée, who died, in spite of the use of pilocarpine, hoang-nan, and electricity to the region of the medulla oblongata.[1]

We now come to the question, what is the method of treatment of hydrophobia which a careful study of the experience of the past, and a just appreciation of the disorder we are considering, indicate as most likely to be of benefit? To answer this question I will suppose one has been called to a case which is suspected to be one of hydrophobia, and describe the measures I think should be adopted under such circumstances. The first thing to be done is to bring some sort of order out of the confusion which is apt to reign before the doctor arrives. Well meaning, but hurtful, gaolers must be called off from the patient, the horrified and horrifying spectators must be dispersed, the patient must be placed in as quiet surroundings as possible, while the doctor strengthens those about by himself setting an example of steady composure. A tolerable degree of quiet having been secured, the next step must be to ascertain what is the real nature of the disorder with which the patient is afflicted. I have elsewhere shown* that there is a large variety of organic and functional diseases having no connection with the bite of a rabid animal, in which the symptoms of hydrophobia are presented. The physician should be familiar with all these and search for their presence with a most rigid examination; and only when all possibility of their presence has been excluded should the diagnosis be concluded upon as one of hydrophobia. If any one of these simulating disorders be found to be the cause of the symptoms, of course the treatment should be that which is proper to that particular disorder. Into the details of this we may not now go. One paper would not suffice to describe the treatment of so many diseases.

But, if the most painstaking and intelligent investigation leaves no alternative but to conclude that the disorder is indeed what is generally understood

[1] Trans. College of Physicians of Phil., 3 ser., vol. I, p. 138.

[2] *Am. Journal of Med. Sciences*, April, 1878, pp. 402–404.

[3] *St. Louis Med. and Surg. Journal*, April, 1879, p. 331. (From *Lyon Médicale.*)

[4] Richardson, B. W., On the Positive in the Remedial Art. *Lancet*, 1878, p. 750.

[5] Murray. Remarks on the Disease called Hydrophobia, small 8vo, pp. ix, 86. London, 1830. P. 82.

[1] Bul. de l'Ac. de Méd., 1882, p. 713.

Since this paper was prepared M. Pasteur has announced that he has devised and practiced a method of preventive inoculations with an attenuated virus of rabies, so that he has thereby rendered certain dogs absolutely incapable of contracting the disease As he has not tried his method on human beings, and does not dare to suggest that it shall be so tried, it might be thought that it does not concern us at present. But in view of the fact that this announcement was given in a sensational shape to the newspapers, and that it was accepted by many medical men, as well as the laity, as furnishing a reliable means of protection against death from hydrophobia, it may be worth while to put those who are not familiar with M. Pasteur's methods in general, and what he has and has not done in regard to the subject of hydrophobia in particular, on their guard against too hasty an acceptance of this announcement, and to protest against it, as founded upon false premises, arrived at by false reasoning and being a false conclusion.

*See a paper read before the State Medical Society of Pennsylvania, May 15, 1884, "Disorders mistaken for Hydrophobia."

by the term hydrophobia, then a plan of treatment must be adopted which corresponds with what is known in regard to the nature of this disorder. Such a plan includes certain general—we may say, moral—principles as well as a *modus medendi*. Indeed, I believe the former are of a greater importance in our present state of knowledge, than the latter. The first general principle to be observed in the management of a case of supposed hydrophobia is not to be misled by the real or apparent inability of the patient to drink; and joined with this should be an attempt to prevent the patient from being misled by it. The doctor should know that this symptom, in the very manner and form supposed to be peculiar to hydrophobia, may be absent in this and present in a number of other disorders. The patient should be also informed of this fact in every case. Further, both doctor and patient should get rid of the time-honored but utterly erroneous notion that the patient's life is endangered by this inability. And, since this is so, all attempts to induce a patient to drink are useless at the best and pernicious at the worst. As a means of aiding the diagnosis they are of no use to the physician, and they always do harm to the sufferer. If this sufferer be a little child, and force be used, as it too often has been, to compel the patient to drink, then the perniciousness of the practice rises to the point of absolute cruelty, and marks at once the ignorance and the hardness of the doctor.

Only less reprehensible than this are such tests as presenting a looking-glass to the patient, or blowing or sprinkling water on him, which ought to be forever banished from an enlightened medical practice.

Almost every writer on the subject of hydrophobia warns against the danger of making inquiry in the hearing of a patient, after a suspected bite. I think that one might even go farther than this, and say that inquiry after a bite of a mad creature may well be postponed altogether until after the death or recovery of the patient. The knowledge of such a bite is never necessary to the diagnosis, and the determination that no such a bite has occurred does not overthrow it. Such inquiries always do harm to the patient or his friends, and they never do any good to the doctor, at that time. He may therefore well exercise his patience, and restrain his curiosity until his patient is recovered or dead, when an exhaustive detectiving of all the elements of the case may contribute to the advance of science without prejudice to the subject of the investigation.

But, while observing the precautions just mentioned, I think one may err in preserving too scrupulous a silence or insincerely repudiating the idea of hydrophobia. If this idea really has not entered the head of the patient, then it ought by no means to be suggested. But if it be already there, the subject must not be so studiously avoided—much less made the occasion of lying—as to betray to the patient the despair with which it fills the doctor. The latter need never deceive himself with the notion that he can thus hide the dreadful conviction which has taken possession of him. When matters have come to this pass, frankness and as much fearlessness as can be summoned are best calculated to win the confidence of the sufferer.

On the other hand, while the doctor is avoiding the useless attempt to deceive his patient, by a too significant silence, as to the apparent character of the disorder, he should not be misled by a corresponding attempt on the part of the patient. It is far from uncommon for the latter, by persistent silence or even by stout, and seemingly sincere denials, to strive to convince himself as well as his physician that he cannot have hydrophobia. For such is the strangeness of this disorder that, as the old Spartan youth denied all knowledge of the stolen fox which he had hid under his cloak and which was at that moment tearing at his vitals, so in cases of supposed hydrophobia will both patient and doctor try to deceive each other as to what is going on in their minds, the one to save his life, the other to redeem it, until each sees that the other has recognized the poor attempt, and both give it up before the horror which will no longer be held down.

Again, the sufferer with hydrophobia should never be treated with violence. If the disorder be an acute mania, or the fury of a convulsive or febrile delirium, forcible restraint may be required. But it is not needed in hydrophobia. It is true that patients sometimes call for it and doctors often prescribe it. But in both instances this shows the possession of popular, as opposed to scientific, ideas in regard to the subject. Forcible restraint is not demanded for the safety of the bystanders, and it is injurious to the patient. Indeed, there can be no doubt that the greatest struggles of patients who have been subjected to force has been provoked by that very force. The fear of ordinary acts of violence on the part of one supposed to have hydrophobia, is usually supplemented by the fear that a like disorder may be contracted from his bite or the absorption in any way of his saliva. This fear is utterly groundless. There is not one respectable assertion in all the literature of the subject in support of it. I have myself had occasion to put this confidence to the proof, and I have no uncertainty in regard to it. I recommend the attainment of a like confidence to others. For they must be without fear themselves if they would encourage others. And if they have no fear, then they can be of great service at a time when fearlessness seems to be about all that is left to those who would be helpful if they could.

Thus every effort of the doctor must be used to obtain and preserve as great a degree of calm as possible. Then the patient must be disturbed as little as possible. No offer of food or drink should be made. For if a man can live forty days without eating, one may well take the responsibility of yielding to the determination of a patient who not only fears and hates the thought of meats and drinks, but spues them out of his mouth if by any means one succeeds in forcing them upon him.

As to the medicinal treatment of hydrophobia—the less there is of this the better. In most cases there are three ways of administering drugs which are available: by the rectum, by inunction and by hypodermic injection. In many cases medicines can at

times be administered by the mouth. In choosing his remedies and deciding upon the quantity to be given, the practitioner must not be tempted into meeting the violence of the disorder with opposing violence of medication. Whatever plan of treatment be adopted it must be temperate. No use of large doses of morphia, chloral, atropia, curare, chloroform, or such-like, has ever proved of value. Here, if ever, it is the "soft answer" which may be expected to "turn away wrath." I think the use of moderate doses of cannabis Indica may prove useful. Alcohol, in small and repeated doses, taken in hot water, I think might prove a valuable remedy,—it being understood that I presume the exclusion of an inflammatory disorder with hydrophobia merely as a concomitant. I am inclined to think also that something might be expected of the method of "mixed narcosis," proposed for surgical operations, in 1877, by Nussbaum. In this method a dose of ¼-½ gr. of morphia is injected hypodermically, and in a few minutes chloroform is given by inhalation. If this could be done without too great resistance on the part of a patient with hydrophobia, I believe it would prove very advantageous. These things, then, I would recommend: moderate doses of chloral or cannabis Indica at the very beginning of the seeming development of the disorder; later frequently repeated moderate doses of whiskey or brandy in a little hot water, given by the mouth if possible—and this is oftener possible than most persons would suppose—by the rectum, if necessary. Last of all, the plan of injecting subcutaneously ¼-½ gr. of morphia (adult dose), followed by the inhalation of chloroform, might be tried. The use of prolonged hot baths I believe may do good, not as a specific, as some have foolishly supposed; but by the activity of the circulation they produce and their invigorating effect.

In all the treatment of hydrophobia, the cardinal principle should be that the medication must be reduced to a minimum. Indeed, I have no doubt that better results than have been attained by any method heretofore recommended would be secured if no medication at all were employed. There can be no doubt that it is true, as Decroix asserts, that the ordinary methods of treatment act adversely to the interests of the patient, and that the rational plan is restricted to two indications: to protect the patients from all causes of excitation; to procure for them all the moral and material satisfactions compatible with their state.[1] "By adopting this method," Decroix adds, "there will be obtained a natural hydrophobia more benign than the artificial hydrophobia, which is a consequence of the incendiary medication, and cases of cure will certainly be less rare than in the past."

Only last year, M. Barthélemy called attention to the suggestions of Decroix, and emphasized them by a reference to the practice of M. Abadie, a veterinarian of the Department of the Loire Inférieure, in the treatment of tetanus in horses. The latter, after observing the lamentable failure of active treatment, adopted with marked success the plan of letting the animals strictly alone in a darkened room, from which all sights and sounds were rigidly excluded. Further, M. Barthélemy recalls the method adopted by M. le Docteur Bouley[1] to control violently hysterical patients. This consisted in shutting them up in a padded room, from which all light was excluded. "C'était," he says, "ce que notre maitre appelait le traitement par astimulation." From this he thinks a profitable lesson may be drawn as to the management of cases of hydrophobia.[2] This is undoubtedly true, and it seems strange that this obvious indication of the success which has often followed the administration of absurd and inefficient nostrums, namely, that no medication is better than active treatment, has for so many years failed to secure the application in teaching and in practice which it should have had.

In concluding, I would state my belief that the uncertainty and despair which prevail in regard to the treatment of hydrophobia, are to be attributed largely to the commonly held opinion as to the specific nature of the disorder. I have elsewhere stated the conviction to which observation and a laborious study of this subject have led me, namely, that hydrophobia is not a specific, inoculable disease; and that the dread of swallowing, and the other phenomena which are known as hydrophobia, do not indicate a specific morbid process, but are mere symptoms of a variety of disturbances of the animal economy, some of these being of an organic, others of a purely functional (in the usual sense of this term) character.[3] This attitude has been so often misstated as a denial of the existence of hydrophobia, that I think it important to say that I do not deny that there is a set of symptoms which, for want of a better name may, without great impropriety, be called "hydrophobia." What I deny is that these symptoms depend upon a specific virus derived from a rabid animal. It is undeniable that the symptoms of hydrophobia may *follow* the bite of a dog suffering with what is called rabies; but so they may, in most typical form, the bite of one that is simply angry, or not angry at all, and quite healthy, or of a man who is simply angry, or they may arise in the progress of a variety of diseases, or spontaneously as the result of fear. In all these cases the phenomena and the issue are exactly the same. There can, therefore, be nothing specific in the saliva of a so-called mad dog, unless the word "specific" be given a new meaning to suit this particular case.

After a very careful study of the literature of hydrophobia from the earliest times, and after some personal experience, I have therefore come to the conclusion that the specific theory is false, and that the view that hydrophobia is merely a symptom and not a disease, offers the only thread which can guide one through the labyrinth of facts and theories, somewhere in the maze of which the truth in regard to it lies hid. Equally do I believe that the adoption of this opinion offers the only hope for a rational and satisfactory plan of treatment. For 2,000 years, or perhaps even longer, the specific theory has had prac-

[1] Decroix, M. E. Note sur la curabilité de la rage. *Bul. de l'Ac. de Méd.*, 20 Juin, 1882. P. 699.

[1] This physician must not be confounded with M. Henri Bouley, the veterinarian, who is famous for his studies of rabies.

[2] Barthélemy. Le Hoang-nan et le rage. *Bul. gén. de thérapeutique*, T. cv, 1883. Pp. 147-160.

[3] See Trans. of the College of Physicians of Philadelphia, 3rd ser., vol. vii., pp. 17-35. New York *Med. Journal*, Dec 29, 1883, vol. xxxviii, pp. 707-711.

tically undisputed sway in the world, and after all there is not a man of the nineteenth century who can propose a method of treatment, founded upon it, more rational or more efficient than those which were used in the stumbling infancy of the art of medicine. Cælius Aurelianus was as sensible as Dr. Rush, and Celsus was no whit behind Sir Thomas Watson. The most enlightened of its adherents come before the world offering in one hand uncertainty and contradictions, in the other despair. This remarkable paradox I attribute to the fact that, wearied with following the luring *ignisfatuus* of the specific theory, men have come to believe that the nature of hydrophobia is beyond human understanding. The cause of science and the cause of humanity demand, I believe, that we shall let this theory go. It will not be lost. Such things may be trusted to come back. But truth lies at the bottom of a well. And, if we will leave this subject to the generations which shall follow us in a clearer light than that in which we have received it, it must be by sweeping away the marvellous and fabulous features which have come to be accepted as essential parts of it, and by rigorously applying to what is left the well established rules of common experience and analogy. Then, and then only, will it come to be known what hydrophobia is, and how it should be treated.

THE SIGNIFICANCE OF BLOODY DISCHARGES FROM THE BOWELS IN YOUNG CHILDREN.

BY FRANK WOODBURY, M.D., OF PHILADELPHIA.

Read in Section on Diseases of Children, American Medical Association, May, 1884.

The occurrence of blood in the alvine discharges of a young child, whether in amount large enough to constitute actual intestinal hæmorrhage, or existing only as a few small clots or streaks of blood, is a symptom which naturally excites alarm in the minds of those having it in charge, and usually is the signal for prompt appeal for medical aid. Whether rightfully or not, in an individual case, it may be considered as the rule that this accident in childhood is of much more serious import than in adult life, although in some instances the pathological conditions are identical. On account of the gravity and urgency of the morbid states involved, the opportunity for the exhibition of skill in diagnosis, and the possibility of brilliant results from appropriate treatment, I would regard this class of cases as second to none in interest or importance to the general practitioner of medicine. It was with this thought in mind, that I determined to submit this subject of The Significance of Bloody Discharges from the Bowels in Young Children for discussion to-day. I do so the more willingly because, so far as I can learn, this subject has not been considered at any previous session of this Association, and because many of our text-books on diseases of children either observe complete silence upon this symptom or make only incidental and altogether inadequate mention of it as complicating certain conditions.[1]

Like hæmatemesis, bleeding from the intestines is merely symptomatic; its causes vary greatly in site, nature and gravity. A correct and promptly rendered diagnosis in such cases sometimes furnishes a crucial test of skill in the physician. I need not dwell upon its importance, since we recognize the fact that a few hours' delay may cost the life of the patient. In a case in which the range of remedies is from laparotomy to worm-lozenges, delay and error in judgment are alike dangerous.

The term Melæna (*Μελαινα*) was anciently used to indicate the discharge of a black material from the stomach, or the bowels, or both. Since the action of the digestive fluids upon blood effused into the small intestine, causes it to lose its ordinary physical characters and to change to a black, tarry substance, the propriety of the application of this term to many cases of intestinal hæmorrhage is evident. But, as the blood occasionally preserves its red color; and, on the contrary, black discharges may be due to other causes than hæmorrhage (*i. e.*, the administration of certain substances such as bismuth, animal charcoal, etc.; or, more rarely, to altered secretions from the mucous membrane of the intestinal tract,[2]) I have preferred to employ the term "bloody discharge," as being more comprehensive than either melæna or intestinal hæmorrhage, and being universally recognized as a symptom, will be free from a possible objection on account of being mistaken for the title of a pathological condition.

Blood may also appear in the discharges, from a lesion existing in the stomach, œsophagus, or upper air passages—or even from a source external to the patient, being taken with the food, as when an infant nurses from a cracked and bleeding nipple—but for our present consideration, it will be sufficient to limit the consideration to lesions below the pylorus; and the brief time at my disposal warns me that a few only of the leading diagnostic features of the morbid states concerned can be presented for discussion.

The first question that the clinician, when confronted with such a case, attempts to solve is: What is the site of the hæmorrhage? and secondly: What is its cause? Let us pass briefly in review some of the morbid states giving rise to bloody discharges from the bowel.

Commencing with the lower extremity of the intestinal tube, we recognize several local conditions which may be accompanied by hæmorrhage.

[1] It is only just to state that Dr. J. Lewis Smith, of New York, in his admirable work on Diseases of Infancy and Childhood, gives the best consideration of this subject that I have met with among our systematic treatises.

[2] In a foot-note to the article on Melæna in Copeland's Dictionary of Medicine, New York, 1846, vol. ii, page 954, a case is reported of an anæmic child, three months old, which had melæna without intestinal hæmorrhage: there were black discharges during life, and found after death along the whole course of the intestines, which was apparently a morbid secretion from the mucous follicles. The condition appeared to be an abnormal excretion of carbon, in some way dependent upon a congenital absence of the gall-bladder and hepatic ducts.

In cases where a doubt exists as to whether the black material excreted contains blood or not, the question may be solved by simply diluting the discharge with water, which will bring out the red color of the hemoglobin if it be present. The microscope or the spectroscope will furnish the decisive test of the presence of blood.

Venous hemorrhoids may occur in young children. These may be examples of nævus, or may come under the class of internal hemorrhoids. Notwithstanding the fact that cases of supposed piles in infants usually prove to be polypi upon closer investigation, Allingham[1] reported a case, in a boy three years of age, which had bloody discharges from the rectum, and upon examination, thin vascular piles were found to be the cause of the bleeding. Sedgwick[2] and Syme[3] have also called attention to the possible existence of piles at an early age of life. Condylomata need not be confounded with hemorrhoids; these are not rare in children, and may be caused by irritation, uncleanness or worms; they are not necessarily due to syphilis.

Fissure of the rectum is a rare cause of bloody discharges in children. Allingham mentions a case in a boy 4½ years of age.

Prolapse of the rectum is less frequently accompanied by bleeding in children than in adults, but it is sufficiently common to warrant consideration. It is usually caused by weakness of the sphincter, following prolonged diarrhœa; or it may be due to constant straining, caused by a reflex irritation, such as from a stone in the bladder, a contracted prepuce, or polypus.

Polypus of the rectum is more frequent in children than is generally supposed, and is usually announced by recurrent attacks of bleeding. Bryant[4] says that is is the principal cause of hæmorrhage from the rectum. Therefore, repeated attacks of intestinal bleeding should lead to a direct examination of the bowel. When found, the polypus may be broken off by the finger nail without inducing hæmorrhage. Its usual site is inside the internal sphincter, from two to six inches within the bowel. The pedicle may be several inches in length. Gross[5] recommends seizing the tumor with the forceps, if not very vascular, and removing it by torsion; if vascular in its appearance, "the safest plan is to tie it and let it slough off." It is reported that Bryant saw twenty cases, all in children less than two years of age, which were operated upon successfully.[6]

Foreign bodies may cause ulceration and hæmorrhage; various substances, such as pieces of bone, glass, oyster shell, etc., may be forced or impacted in the rectum, either swallowed by the child or introduced into the rectum, by mishap or malice.

Traumatism. Bearing in mind the facility with which fatal hæmorrhage might be induced by wounds of the intestine and adjoining structures, it might be the means employed for criminal purposes. In cases of acute hæmorrhage from the bowel, in a child hitherto healthy, local examination of the part, both before and after death, should not be neglected.

It may be proper to say here that a hæmorrhage may be sufficiently profuse to cause death, may occur without any discharge of blood externally. J. L. Smith refers to a case (Bidnar) of a boy 11 days of age, in which the skin rapidly became yellow and cool, respiration scarcely perceptible. He died on the twentieth day of exhaustion, and it was found that the symptoms were due to a concealed intestinal hæmorrhage.

In *dysentery and entero-colitis* of sufficient severity, blood will often appear in small quantities in the stools during the height of the inflammation; where it occurs in larger quantities it indicates ulceration, and in chronic colitis the discharges may consist of pure blood. Without stopping to discuss the parasitic nature of ordinary dysentery, I would notice that *mycosis* has been assigned as the cause of dysentery with bloody discharges. Lambl reports the case of a child 2 years old, which died of enteritis and hæmorrhages from its intestines, where *amœba coli* were considered to be the cause. Experiments made by Lösch favor the view that the dysentery in such cases is primary, and that the amœbæ appear later and maintain the morbid state. We are without information as to the source of the amœba.

Intestinal worms have been mentioned as causing the appearance of traces of blood in the discharges, mixed with mucus.

Intussusception of the bowel, either by descent of part of the ileum through the ileo-cœcal valve, or elsewhere in the course of the bowel, is very commonly accompanied by bleeding. This symptom, in a case of constipation, obstinate vomiting, with tender, swollen abdomen, in which there is a sausage-shaped tumor may be felt in the course of the bowel, indicates the occurrence of an intussusception. In such cases the injection of large quantities of warm water will usually be successful in reducing the invagination. Etherization by the rectum might be useful, followed by distension of the bowel by air. The knee-elbow position will materially assist the enemata in restoring the bowel to its normal relations. Should these measures fail, after several attempts, laparotomy offers better chances of recovery than to wait for the sloughing of the intestine, which sometimes does occur. Although early operation by modern methods of opening the abdomen, generally offers good prospects of success, yet this result can not always be promised. Godlee[1] reports a successful case in an infant of nine months, in two others the patients died. He calls attention to the fact that the intussusception does not always begin at the ileo-cœcal valve; although, according to Bryant, (*loc. cit.*), this is the most common site in infancy and childhood. The condition may be gradually established without interfering greatly with peristalsis and defecation, or it may rapidly give rise to symptoms of complete obstruction of the bowel. Such acute cases have urgent symptoms and require, usually, early operation. In the former, prompt operation is not so imperative. Mr. Hutchinson, of London, opened the abdomen of a child, two years of age, on the thirtieth day of the symptoms, and restored the invaginated bowel with a successful result.[2]

Ulceration of the small intestine may be due to

[1] Dieases of the Rectum.

[2] London *Medical Record*, 1867, v. i, 495.

[3] London *Medical Record*, 1853, vol. ii.

[4] Practice of Surgery (American edition), Phila., 1881, p. 537.

[5] System of Surgery, 1872; vol. ii, p. 648.

[6] Dictionnaire de Med. et de Chirurgie Pratique, vol. xix. Article on Intestinal Hæmorrhage.

[1] Clinical Societies Transactions, vol. xvi, p. 55.

[2] Med. Chir. Transactions, vol. lvii, 1874.

sloughing of necrosed follicles in the course of simple catarrhal inflammation, or it may be tubercular in its origin. In the course of tubercular meningitis, tubercular ulcers may occur in the bowel; and in tubercular peritonitis the occurrence of diarrhœa and offensive stools, with the discharge of blood in small clots, is very suggestive of accompanying ulceration of the bowel (Eustace Smith[1]).

The occurrence of such a hæmorrhage may give rise to the suspicion of typhoid fever being present, but the clinical history of the case will afford the means of distinguishing the two diseases.

The preceding conditions have been, principally, those referable to definite lesions of the large and small bowel. We shall now consider a few disorders less localized in their nature.

Congestion of the mucous membrane, with or without accompanying catarrhal inflammation, is quite common in young infants, and occasionally causes bloody discharges. This congestion may also be secondary to diseases of other viscera. Mosler states that chronic diseases of the spleen are liable to be complicated with diarrhœa. He also says: "The phenomena of irritation of the intestinal mucous membrane are produced in leucocythæmia and its allied conditions by the accompanying lymphoma. At other times it is a congestive catarrh of the intestinal mucous membrane. The stools contain large masses of mucus and pus, and are not infrequently mixed with blood; dark, tarry blood is evacuated from the stomach, as well as from the intestines. (Ziems en, Encyclopædia, vol. viii, p. 373).

Hyperæmia may be due to disorder of the liver or its imperfect development. Hepatic cirrhosis has been observed in young children, as a cause of intestinal hæmorrhage, by Reynolds,[2] Murray,[3] and others. Weber met with a case in a new-born child.[4] Occlusion of the portal vein is also noted as a possible cause by Budd.[5] Embolism of the umbilical vein and its branches causes congestion of the intestines by obstructing the portal circulation. Lederer reports eight cases of intestinal hæmorrhage from this cause, five of which were also accompanied by umbilical hæmorrhage.[6] Embolism of the branches of the umbilical vein may also lead to the formation of small ulcers in the intestinal tract.

There still remain for consideration the class of cases in which the pathological condition is not well understood. It may be connected with some disorder of the blood. Here may be appropriately considered those peculiar cases of hæmorrhage from the bowel coming on in the first few days of life, generally from the first to the sixth day, which are known as *melæna vera* or *melæna neonatorum*.

Attention has been pointedly directed to these by Billard,[7] Croom,[8] Rilliet and Barthez and others. The following will serve as an illustration: A female child of healthy parents, born after an easy labor, was apparently well until 35 hours after birth, when an intestinal hæmorrhage occurred, and the little patient died, ten hours later, of exhaustion. At the post-mortem no cause for the hæmorrhage was found; no trace even of organic lesion was detected.[1] In such cases the congestion has been attributed to a plethora, and it has even been recommended that the ligature be removed and some bleeding be allowed from the umbilical cord in order to relieve this hypothetical condition (Billard). It is more probable, however, that the intestinal congestion is caused by collateral hyperæmia associated with some disturbance of the lungs or heart; for Ebstein has found that suspension of respiration in animals produces congestion and extravasation of blood and ulceration in the mucous membrane of the alimentary canal. Of twenty-two cases reported by Rilliet and Barthez, twelve recovered. Probably, as suggested by Day, some of these were cases of pressure of the child's head during tedious labor, and congestion of the venous system from the difficulty in establishing respiration at birth.

Cases of enterorrhagia attributable to *hæmophilia* have been published by Laycock,[2] Sedgwick,[3] Gould,[4] Huss,[5] Cousin,[6] and others.

In such cases the peculiarity is generally known to exist in some other member of the family.

Some cases of *melæna neonatorum* seem to be really due to *purpura hæmorrhagica*; and a number of authorities have given weight to the opinion that in others it may be due to a general cachexia, associated with syphilis. There is good reason for doubting, however, that syphilis in the parents can cause the hæmorrhagic diathesis in the child.[7] Such cases are probably secondary to disease of the blood-vessels, or liver, or both.

Blood sometimes occurs in the discharges during the specific fevers from congestion or ulceration of the mucous membrane. It is only of late years that typhoid fever has been generally acknowledged as occurring in infancy, although Rilliet called attention to it in 1840. (Thése de Paris, 1846).

Typhoid fever sometimes occurs within the first year of life, but is rare until after the expiration of the second year, being more frequent between the ages of eight and eleven years. Still, Meigs and Pepper have met with well-marked instances at the age of 18 or 20 months.[8] Typhoid fever ulceration being unusual in children, this must be a very remote cause of the appearance of blood in the discharges.

Attention has recently been directed to cases of visceral rheumatism in the adult. I met with a case last year in a child, which I may briefly mention. It was that of a boy about 8 years of age, who, during the progress of an attack of acute articular rheuma-

[1] Clinical Studies of Dis. of Children. London, 1876, p. 277.
[2] *Medical Times and Gazette*, 1866. Vol. i, p 35.
[3] *Lancet*, 1863, Vol. ii, p 225, and 1875, vol. i, p 698.
[4] Steiner, Diseases of Children, by Lawson Tait.
[5] *Medical Times and Gazette*, 1860. Vol. i, p 593.
[6] Quoted by Smith *loc cit*, from *Zeitschrift für Kinderheilkunde*, 1877.
[7] *London Medical Record*, 1853. Vol. ii, p. 115.
[8] *Medical Times and Gazette*, 1880. Vol. ii, p. 480.

[1] *Medical Association Journal*, 1854. Vol. i, p. 532.
[2] *Med. Times and Gazette*, 1862, vol. i, p. 152.
[3] London *Med. Record*, 1861, vol. ii, p. 206; 1867, vol. i, p. 492.
[4] *Med. Times and Gazette*, 1858, vol. i, p. 19.
[5] London *Med. Record*, 1867, vol. i, p. 492.
[6] *Med. Times and Gazette*, 1869, vol ii, p. 277.
[7] Peterson. Ueber Syphilis Hæmorrhagica Neonatorum. Vierteljahrs. für Dermat. ü Syphilis, 1883, p. 509.
[8] Practical Treatise on Diseases of Children. Philadelphia, 1877, p. 827.

tism, at about the fifth day was seized with obstinate constipation, with discharge of blood from the bowel. This, with the occurrence of vomiting of everything taken into the stomach, even of small quantities of ice-water, and great restlessness, led me to suspect intestinal obstruction. A tender spot was found in the left hypochondrium and near the umbilicus, but no well-defined tumor was detected. He was treated by morphia by the mouth, and by large hot water enemata, which were returned tinged with blood. The third or fourth injection was followed by fœcal discharge, and the condition was relieved. The patient recovered finally, and was seized with chorea during convalescence. If there was actually an intussusception in this case, I believe that it was favored if not caused by a local manifestation in the intestine of the rheumatic poison.

I trust that in bringing to a conclusion this hasty review of an important subject, we are impressed by the variety of the conditions upon which these bloody discharges may depend, and especially by the necessity of careful physical explorations wheer the symptom persists.

DISCUSSION.

Dr. J. Lewis Smith said the pathological state is different in the different diseases. The most frequent and common causes (when not mixed with mucus) are purpura hæmorrhagica and intussusception. The latter is an important matter. There is none more important in diagnosis. This occurs chiefly at the ileo-cœcal valve, or it can occur at some point below, become wedge-shaped, congested, and blood oozes. There are two common points. These may either be at lower part of ileum or in the colon. Congestion becomes so great that hæmorrhages occur. The color of the blood is dark-red, with mucus. When tenesmus is present, it can be mistaken for dysentery. Instead of mucus, pure blood can be discharged every few moments with tenesmus. This disease must be recognized early, as the diagnosis is of importance. In these cases, warm water injections into the rectum is good treatment. The diagnosis can be made without a tumor being present, by blood appearing without mucus.

The next principal cause—morbus maculæ or purpura hæmorrhagica, is most common in large cities and hospitals, among broken-down and cachectic children, but is also found in well nourished ones from six to eight months old. The changes occur in the capillaries and not in the blood. This is the true condition, as is proved by microscopical examinations. Blood is allowed to transude. Knows no case where hæmorrhages resulted from worms, but this could take place where the bowels were ulcerated and the worms irritated the places so diseased. Typhoid fever occurs in children, but ulceration in children, as a rule, is not sufficient to give rise to hæmorrhages. In the majority of these cases there is no tenesmus.

Dr. S. S. Adams said that Dr. Woodbury failed to bring out the important point of the dangerous period of these bloody discharges. He said that the cessation of the bloody discharges was really the signal of danger. He said that some time since, Dr. Busey wrote an admirable paper on "Thrombosis of the Sinuses of the Dura Mater in Fatal Cases of Dysentery in Young Children," in which he showed that when the blood ceased to appear in the stools, then the critical moment arrived. Dr. Adams had superintended the post-mortem examinations made in the cases cited, and, as Dr. Busey had expected, thrombi were found in the sinuses. In such cases as Dr. W. had cited, the stimulation should be begun early and diffusible stimulants freely administered. In young children, the fontanelle is our guide. So long as it is depressed, we need have no fear in freely stimulating. Whiskey, camphor, or ether should be given.

Dr. Fry remarked that he had noticed during attacks of entero-colitis, that the occurrence of hæmorrhage from the bowels marked a favorable epoch in the disease. It probably acted by depurating the congested mesenteric vessels.

Dr. Woodbury. The time was not long enough to go into the subject more closely. Would recommend digital examinations in all cases.

ON THE TREATMENT OF TYPHOID FEVER.

BY S. K. JACKSON, M.D., NORFOLK, VA.

Read in Section on Practical Medicine and Materia Medica, American Medical Association, May, 1884.

My apology for occupying the valuable time of this Section must be found in my conviction of the importance of the subject I propose to discuss. I know it is thought trite and hackneyed, but the discussion of it cannot be considered as finished until there be a better agreement among us as to the treatment of this disease, or until the mortality from it is diminished much below its present rate. It is claimed to have been reduced from the 18 to 20 per cent. of a half century ago to 10 or 12 per cent.; but these lowest figures are still too high, and it is to be hoped that the profession will not be satisfied until there is a much greater reduction.

My object is not to boast of any great success in managing this disease, but merely to call attention to a line of treatment which has furnished results very different from the recorded experience of others; a treatment suggested by the recognition of several pathological conditions, which, though long since demonstrated and, I believe, generally admitted to exist, have been entirely ignored by the profession when looking for indications of treatment.

To prove this assertion it is only necessary to enumerate the various means at different times resorted to for combating this disease; means not only not indicated or called for, but oftentimes actually injurious.

The limits of this paper will permit me to recall but a few of them. Blood-letting, urged by Louis—free evacuations—tartarized antimony — calomel—then the "expectant" plan of treatment, the do-nothing plan, leaving all to nature—then follows the suggestion of phosphoric acid as a febrifuge—next came the alum treatment of Barthez—then the confi-

dent assertion that large and repeated doses of quinine was the one thing needed—then came the announcement that the latter did no good, but actually did harm—next occurred a revival of the mercurial treatment pushed to salivation—then turpentine is lauded as the remedy—then succeeds a revival of quinine in large doses, with conflicting testimony *pro* and *con;* some asserting that it produced alarming prostration, others claiming it as valuable for reducing temperature. Next looms up the hydropathic treatment, by many lauded, but considered by others to be liable to grave objections.

While all this conflict has been waged, I have been pursuing one plan of treatment for the past thirty-five years, from which I have not had any reason to deviate; and there is not included in it one of the suggestions contained in the above enumeration. The result of this plan I am reluctant to state, its value any one can determine for himself.

Among the first and most prominent pathological states which early attracted my attention as furnishing indications of treatment, was the demonstrated nitrogenous waste of the system—the diminution of fibrine—the deficiency of urea, and all nitrogenous excretions. If it were not the case that there was a deficiency of the nitrogenous constituents of the blood, it might be supposed that these excreta were retained in the system as in the case of desquamative nephritis, but their absence is evidently due to the fact that there are none to be thrown off; we have no signs of uræmic poisoning, even the coma of enteric fever has never been attributed to that cause.

Into the cause of this nitrogenous deficiency I cannot now inquire, but will only suggest one or two probable factors.

The first is an inability to digest nitrogenous food, caused by a deficiency of the digestive fluids, which deficiency is due to the fact that all the glands and glandular follicles whose duty it is to secrete these fluids, are in such a state of engorgement or inflammation as to render them incapable of performing their function.

Another possible, if not probable, cause of this nitrogenous waste is due to the consumption of this important element by the parasitic organism which is the acknowledged etiological factor in the production of enteric fever. That this microzoon is a nitrogen-feeder, is evident from the fact that he lives and is developed in nitrogenous matters, in urea and all nitrogenous excreta. These furnish its peculiar pabulum, in them it is generated and thrives. Old timbers saturated with urea, the rotted logs of a country cabin against which men have constantly micturated, have been known to be fruitful sources of this disease. The most serious outbreak of typhoid fever I have ever known, occurred during our late war (1862) in a Mississippi Brigade, who were encamped at the foot of a mountain-slope where a large amount of leaf-mould had been for years accumulating. This spongy mass when saturated with their urinary deposits, and probably in a state of fermentation, caused the most malignant epidemic of this disease that has occurred in my experience. I hope, some day, to obtain access to the official records to ascertain the great numbers who fell victims to it; they are numbered by hundreds. I hope I may be pardoned for mentioning here, that of 223 cases that were taken under the treatment I am now advocating, not one died. The Brigade alluded to, that of Gen. D. H. Hill, encamped at the foot of a spur of the Catoctin Mountain, two to three miles northwest of Leesburg, Loudoun Co., Va., within forty miles of where we now stand.

If further proof be needed that this microzoon is a consumer of nitrogen, it is furnished by the ammoniacal exhalations emitted by a typhoid fever patient, from the breath, the skin, as well as by the urine, which, when freshly passed, as is known to all, emits the odor of ammonia, like stale urine in a state of decomposition.

These exhalations are undoubtedly due to the decomposition of the nitrogenous constituents caused by this micro-organism.

This pathological condition, in my opinion, furnishes us with the most important indication in the treatment of this disease, and has shaped my practice during the long period mentioned.

It is clear then that our aim should be to supply this nitrogenous waste. How is it to be done? By nitrogenous food, you will say; a very rational way of accomplishing that desirable end, were it not for the utter impossibility of digesting and assimilating this food, to which we have already alluded. There is only one way, known to me, of effecting this purpose, and that is by the free administration of AMMONIA, even to saturation.

Fortunately, this nitrogenous base furnishes us with salts of such different therapeutical powers that we have no difficulty in finding one adapted to any and every stage of the disease and every probable condition of the patient during its existence or progress. It supplies us in the nitrate with the most sedative salt we possess, and in the carbonate, with the most stimulant salt in our Materia Medica. The only other salts of ammonia I have been in the habit of using in the disease are the acetate and the hydrochlorate, in conditions which will be presently pointed out.

The high febrile condition of the early stage, high pulse, high temperature, etc., calls imperatively for the nitrate, which in 10 or 12 gr. doses will reduce the highest temperature I have met with, down to about 102° F. At this degree, which is not a dangerous heat, it can be kept during the whole course of the disease.

It is to be expected that there may be some fluctuation in this contest between the heat-producing and heat-allaying agents, but I have never known an instance in which, during the administration of this salt, the temperature rose again over 103°, after having been once reduced.

As the disease progresses, when there is less demand for so powerful a sedative, especially if diarrhœa supervene, I substitute the acetate for the nitrate of ammonia, and administer at the same time acetate of lead and opium. If nervous symptoms show themselves, tongue incline to become coated, teeth dry

and covered with sordes, I resort to the carbonate of ammonia in combination with potassa chlorate; and should coma occur, my sheet anchor is the hydrochlorate of ammonia, which I have never known to fail in bringing a case out of that condition.

But I must remark here, that I have seldom (I might say never) seen coma occur in a case where the treatment, detailed above, has been energetically pursued; and it has been mostly in badly nursed cases, or those under a different course of treatment, that I have seen it at all. I have known them to be brought out of it when apparently almost in *articulo mortis*, when all treatment had been stopped and the case relinquished.

With regard to the delirium, which I have always considered as due to a want of nourishment of the brain, the delirium of starvation, it is soon quieted and controlled after the inauguration of this ammoniacal treatment.

I remember a case of a young man, who was found by his friends near the army, about 200 miles from his home, in a state of wild delirium, and in this condition brought home far advanced in the disease, and who became quieted in twenty-four hours, and made a good recovery. If wanderings occur during the treatment, it is owing either to too small doses, or to too long an interval between them. I have known patients to request that the doses be brought closer, on account of a confusion of mind they felt towards the close of the interval between them.

The tympanitis, as everyone knows, is easily relieved by turpentine stupes, turpentine enemata, or by a few drops of turpentine regularly administered by the mouth. With regard to the use of hydrochlorate of ammonia in the state of coma, it suggested itself to me as a solvent for the thickened envelopes of the blood-corpuscles, which some pathologists contend exist in this state, preventing the nourishment of the brain even if the blood were in an otherwise normal condition. Whether this be its *modus operandi* or not, the effect of it is almost miraculous in this condition.

Thus it will be seen that there is no period, no stage of the disease, in which I am not administering some one of the salts of ammonia. Why should I resort to cold baths or cold effusion to reduce the temperature, when I can bring it down and keep it down by means so much simpler, more certain, safer and more philosophical, and not liable to a consequent reaction?

With regard to quinine, I have years ago abandoned it, from the full conviction, in which I agree with Professor Bartholow, that it is not an efficient germicide in this disease. I recognize it as, *par excellence*, the antidote to the malarial poison; but since the organism producing enteric fever differs so essentially from this, it requires for its destruction a germicide of an entirely different character. I have shown this parasite to be a nitrogen-feeder, and an exhaler of ammoniacal gas; but that which produces the malarial fevers is a carbon-eater, and exhales carbonic acid gas. It is not to be expected, then, that the same agent would be equally efficacious in destroying both.

The subject of the selection of germicides has not been studied as its importance demands, and I know no more interesting or profitable field for cultivation. The germ theory of disease has necessitated new lines of treatment, and the application of new remedies, or old ones with new intent. The investigation of the causes of diseases is running ahead of the study of the means necessary to destroy them, whereas it is of the highest importance that they should progress *pari passu*.

In a paper recently read before the Virginia State Medical Society, I have contended that we are furnished with a key to the detection of our germicides by a law, which, as far as I know, I have been the first to enunciate. I claim that it is a law that no organism can live in its own excreta, in the products of its own vital processes. When carbonic acid gas is the excretory product, how certainly does carbonic acid destroy the life that produced it. If alcohol be the result of the life-process, what better agent have we for arresting that process than alcohol itself, and how generally is it used for that purpose. If sulphuretted hydrogen be the exhaled excretion, all acknowledge the efficacy of sulphur and its compounds to arrest the decomposition giving rise to it. So, also, if ammonia be the result of the vital processes of an organism, as we have claimed in the case of typhoid fever, then by this law we have a right to infer ammonia to be the proper and efficient germicide. This furnishes us with an additional indication for employing the salts of this nitrogenous base, for it not only supplies the nitrogenous waste, as we have contended, but also destroys the vitality of the organism which causes it.

On this principle we would select quinine, on account of the large quantity of carbon it contains ($C_{20} = 240$, $H_{24} = 24$, $N_2 = 28$, $O_2 = 32 + H\,O_2$), as *the* germicide for an organism the excretory product of whose life is carbonic acid gas; but never for an organism whose excretion was ammoniacal gas ($N\,H_3$). We see then why it is that quinine is not an efficacious germicide for the enteric-fever parasite, and how it is that ammonia fulfils the two important requirements mentioned above.

If this be a law, as I have stated it, may not the protection of the system from a second attack of contagious diseases generally, be accounted for, not on the almost universally received theory that the system during the first attack becomes exhausted of the pabulum necessary to the life and development of the parasitic organism producing these diseases; but rather to the hypothesis that there is left in the system during the first attack, some excretory product which, being never eliminated, forever thereafter acts as a poison to that organism, inhibiting its vital processes. This appears to me to be the most probable and most philosophical explanation of this mysterious fact.

My experience with this fever when treated by the plan here pointed out, enables me to expect that if a case be recognized as one of enteric fever within three days of its inception, that it may break at the end of the 1st septenary. If it be not recognized as such until the 4th or 5th, it can not yield before, but may at, the end of the 2d septenary (14th day).

If the treatment has not been commenced before the beginning of the 2nd septenary, the fever can not break before the end of the 3rd septenary (21st day); that it will yield on that day, if it has not yielded before, is almost an absolute certainty.

With regard to *diet*, nothing has so surprised me as to see recommended articles of food which for years I have most sedulously avoided, because of having seen them do infinite harm in this disease.

How a physician who has had any experience with this form of fever can recommend farinaceous or starchy articles of food, I am at a loss to understand. The disturbances they occasion, which must have been noticed by every one, have given me more trouble than anything connected with these cases. They are easily understood when it is remembered how entirely absent are the salivary fluids, or any of the fluids containing diastase, by which is prevented the conversion of amylaceous food into dextrine and grape sugar. Such food therefore is not capable of assimilation, but soon after its admission into the stomach undergoes a fermentation which adds to the gaseous distension which may have occurred from other causes, and seriously complicates the case. I regard milk not only as the safe, but as the only useful article of diet, and this I allow *ad libitum*. Even if a larger quantity is taken than can be assimilated, it does no harm, though it is often passed unchanged.

I have never allowed the animal broths in the early stages of the disease without having reason to regret it. So that my plan is to allow nothing but milk, until such time as I perceive evidences of a return of the secretion of the digestive fluids. The chewing of lean meat, swallowing only the juice of it, is a favorite way of returning to animal food, as the act of mastication may stimulate the flow of the salivary fluids.

I fear that the limited time allowed me has compelled such a condensation of so extensive a subject, as to make my paper unsatisfactory. It must be considered, however, merely suggestive, as I have been able only to hint at the salient points of treatment, leaving it to the ingenious practitioner to fill up the details.

Hoping that this treatment of this serious disease may prove as successful in other hands, I leave it with you for trial.

MEDICAL PROGRESS.

MATERIA MEDICA AND THERAPEUTICS.

ON THE THERAPEUTIC DIFFERENCES IN ELECTRIC CURRENTS, AND ON THE ELECTRO-DIAGNOSTIC EXPLORATION OF THE EXTENT OF THE FIELD OF VISION.—C. Engelskjön has an extended article on this subject in the *Nordiskt Medicinskt Arkiv*, which is summed up as follows:

1. The experiences with patients suffering from cutaneous vascular neuroses, have demonstrated that in their local application upon the skin of the subject, with the use of the electric water bath, the two forms of electric currents exercise an inverse action upon the vessels, in that the faradic current dilates the vessels spasmodically contracted, while the galvanic current contracts the vessels that are actively dilated. In conformity with this difference of action, the faradic current produces simultaneously an increase, and the galvanic current a lowering of the temperature. There is no difference in the two poles of the galvanic current.

2. The central application of electricity produces similar effects, in cases analogous to the cutaneous vascular neuroses, so that in certain given cases the relief is due to one only—that is to say, either to the faradic or galvanic current.

3. Comparative observations on patients suffering from *hemicrania and other central neuroses*, have demonstrated that in proper applications the galvanic current acts inversely to the faradic current, in a therapeutic point of view, as one of these currents only will give relief in a case where the other increases the disease. The difference in effect of the two currents upon the subjective symptoms, is in most cases instantaneous and marked. It is possible to neutralize the effects of one by the other.

4. The neurotic affections of the great sympathetic, such as stenocardia, cardialgia, etc., act with reference to electric currents, similarly to the affections of the central nervous system.

5. The author has noted cases that, beyond a doubt, from their clinical condition, were affections accompanied with evident anatomic alterations of the central organs, and which, nevertheless, yielded to treatment in the same way as the neuroses, and were promptly relieved by suitable electric treatment.

6. It is more than probable that the peculiar etiological nature of these cases exercises a determining influence upon the consequent condition of the case in particular, and consequently a knowledge of the etiological conditions in a case is necessary to a suitable selection between the two kinds of current.

7. A diseased condition of the spinal ganglia may act reflexly upon the spinal cord, and give rise to spinal symptoms. In the same way spinal affections are capable of reflex action upon the brain, and of giving rise to cerebral symptoms. Reflex actions proceed *always* from below upwards. It is well to observe here that the organ secondarily influenced by the reflex action should generally be treated by a different current from the organ in which the affection has its origin.

8. The author treats cerebral symptoms by electrization of the medulla oblongata. He places one electrode in the fossa of the ligamentum nuchæ, and the other above the larynx. The spinal symptoms can be treated simply by conducting the electric current along the lower portion of the spinal cord.

9. The increase of morbid symptoms that is provoked by a long-continued use of electricity, so well known, is due to the effect of the current on the healthy ganglionic cells.

10. The electrization of the brain, of the spinal cord, of the ganglia and skin, exercises a powerful influence on the functions of the retina, by, in a given case, the positive current increasing the field of vision, and frequently at the same time increasing

markedly the acuteness of vision. As these effects are, so to speak, immediate, it is possible to utilize them in determining which current is suitable to the case.

11. If we subject for several minutes the hands and fore-arms to the action of warm or cold water, in special morbid cases, the same effect is produced upon the field of vision in the use of the cold water as with the galvanic current, while the warm water produces the same effect as with the inductive current.

12. In their general action on the skin, the cold and warm water exercise, in certain given cases of disease, the same therapeutic effects as the galvanic and faradic currents when used separately, the effects of cold water resembling that of galvanism, and those of warm water being identical with the effects of faradism. If we know the kind of current best suited to a given case, we can indicate the water treatment. *Vice-versa*, the effects of water will indicate the selection of the electric current.

13. There are cases of nervous affections which, while suitable for general electric treatment, are not benefited but made worse by the use of either of the currents in central electrization. It is always possible to relieve a certain number of these cases by electrization of the skin. So employed, the electricity acts in two different ways: 1st, by influence upon the skin itself; 2nd, by influencing the peripheric nerve canals. The two forms of current act inversely in the first case, but not in the second.

14. In using the two currents upon the peripheric nervous circuits in neuralgia, the author has never observed any qualitative difference in their therapeutic activity.

OBSTETRICS AND GYNÆCOLOGY.

Urethral Ectasia or Vaginal Urethrocele.—Professor Santesson describes (*Nordiskt Medicinskt Arkiv*) a case of this rare affection of the female urethra as occurring in a seamstress, 48 years of age, who had passed through two difficult labors, without the use of the forceps, however. The last labor occurred twelve years previously, and from that time she dates her trouble. The first symptoms were itching and heat of the vagina, pain in that organ during coitus and while working, in connection with difficulty in urinating and alternating retention and incontinence.

On examination, the anterior wall of the vagina was found to be depressed at the entrance to the vagina, above and behind the promontory of the urethra, where there was a regular elastic tumor of the size of a walnut. The rest of the vagina and the uterus were in no way abnormal as to size or position. The tumor consisted of a pouch about 3 cm. long, and 2 cm. broad, communicating with the urethra by an opening situated at the junction of the superior with the middle third of the urethra, allowing the passage of a sound of medium size (16). Pressure on the tumor seemed to pass the urine, not to the external meatus, but back to the bladder. A catheter passed readily in the usual way into the bladder, if its point was turned downwards it entered the pouch and would pass no further. If the desire to urinate was not immediately responded to, the urine dribbled away involuntarily, causing acute pain. The urine was of an acid reaction, sp. gr. 1.014, and mixed with a little mucus, but not otherwise abnormal.

Private matters not permitting the time necessary for an operation, the parts were cauterized with nitrate of silver and then with fuming nitric acid, resulting in an eschar which diminished the volume of the tumor, and relieved the incontinence of urine. Three and a half years later the patient returned to the hospital, when an elliptical excision of a part of the vaginal mucous membrane was practised, the edges placed in apposition and united by sutures. Sloughing of a part retarded the cure, but the cicatrix was larger and stronger in consequence. In five weeks' time the wound had healed, and the tumor, firm and contracted, appeared like a solid tumor of the size of the finger. For the four years following there was perfect continence of the urine through the night as well as in the daytime, but negligence and bad habits produced the symptoms anew, and the patient died in the hospital with a puffed and cachectic expression of countenance, œdematous extremities, urethrocystitis and chronic nephritis, and besides specific ecthyma of the trunk and extremities.

There are, in the knowledge of the writer, but six cases of this affection on record, three in France (Toucher, Gillette and Duplay), two in England (Priestly and Lawson-Tait), and one in Germany (G. Simon). The diagnosis does not seem to be difficult, and it can only be confounded with cystocele, which would readily be excluded after a thorough exploration.

With reference to origin and etiology, there are two groups, the congenital ectasias and the acquired ectasias. The first group is not considered here; in the acquired ectasias, there are those formed by a partial dilatation, but more extensive, less closely defined, in a urethra which is normal in other respects, and without a solution of continuity (*diverticula vera*); and those due to a preëxisting cavity (abscess, cysts) situated outside of the urethra, piercing its walls, and in direct communication with it by an opening (*diverticula spura*). The author calls especial attention, in considering the causes of diverticula vera, to the effect of a sudden, intense and somewhat continuous pressure upon a canal surrounded by muscular fibres, as producing atrophy and want of resisting force in the circular fibres of the urethra. The cases already published give the histories of difficult labors, the use of instruments, etc., which could result in contusions and injuries to the parts.

MEDICINE.

Successful Transfusion of Blood in a Severe Case of Uterine Hæmorrhage.—M. Victor Vlemincky reports a case of this nature in *L'Art Medical*. The details are somewhat lengthy, but they are so admirably recorded and of so much interest, that a perusal of them may well repay the trouble.

The case was one of a prostitute, 25 years of age. On April 4 her courses came on, but she continued her occupation, until, as the result of so much sexual excitement, the flow of blood became so serious as to cause her to enter the hospital April 15 for relief. She had a continual flow from the vulva, and every three or four times in the twenty-four hours, she half filled the chamber with liquid blood—no clots. She had already been submitted to the ordinary treatment, the applications of ice over the abdomen, dorsal decubitus, absolute rest, food scanty and cold, and the use of perchloride of iron and of ergotine. This was the third time within a year that she had entered the hospital from this affection, and each time it was due to the same cause. The first time she remained seven weeks, the second time she remained four weeks before being completely relieved. As to her antecedents, she was always well, had a child when 20 years of age, and from the date of her discharge from the Maternity Hospital, had pursued her present occupation. Two years previously she had suffered from gastro-duodenitis with very marked icterus. There was cardiac steatosis, due, no doubt, to the excess in drinking which had produced the gastro-duodenitis.

On entrance she showed a very marked pallor of the skin, flabbiness of the muscles, great paleness of the mucous membranes, pronounced anæmia, coldness of the body, and especially of the extremities, small depressed pulse, general fatty degeneration. No organic alteration of the uterus, cervix thick and soft, no pain in the hypogastrium. The treatment of ice-bags, constantly applied, absolute rest and dorsal decubitus was continued. The appetite was almost gone, the patient taking only a little cold bouillon and iced drink.

April 17 and 18, the hæmorrhage remained the same. April 19, there was a ringing in the ears with vertigo, no nourishment. Revulsives and styptics were without effect, the hæmorrhage increased. April 20, the patient's pallor is alarming, has fainted for several minutes, has a constant tendency to faint, the slightest movement about the bed is disagreeable, a conversation carried on in a voice somewhat raised is excessively disagreeable. Pulse irregular 108, temperature reduced from 98.6 to 97.3 with oscillations. Auscultation gave a heart-sound like the mixture of air and liquid passing through the auricles and ventricles —a gurgling sound. The patient was completely exsanguine. The feet and hands were icy, the tongue, lips and conjunctivæ perfectly colorless. The pulse became less and less perceptible. A drop of blood under the microscope showed red glolules, not deformed but not disposed to group themselves in piles. The proportion as counted was one white to every twenty red corpuscles. April 21.—The foot of the bed had been raised to assist in preventing fainting, but the symptoms continued, one fainting fit lasting 10 minutes and the pulse being 116 and hardly perceptible. M. Poucelet, the interne of the service, offered himself to be used in the process of transfusion, the blood used was defibrinated and filtered, microscopically the red globules were normal, there being one white to four hundred red.

The first attempt at transfusion was practiced upon the leg, but failed because a vein could not be obtained large enough to admit the passage of the canula. The arm was then tried, and fortunately the right median basilic vein admitted the canula. In twenty minutes, proceeding slowly and gradually, 215 grammes (or 37 fl. ounces), of new blood had passed into the veins of the patient, and in an hour's time the operation was over and the wounds closed by carbolized dressings. There was no pain or discomfort expressed, as the blood penetrated the organism, and when about 25 grammes of blood had been injected, the pulse increased in force and amplitude, it still beat irregularly at 128. At the end of the operation the pulse was 116.

The operation was completed at 11:30 A. M., at 12:20 P. M. a rigor set in which lasted until 2 P. M. The patient shivered, her teeth chattered, there was constant subsultus of the muscles, there were dark rings about the eyes and as far as the cheek bones, the naso-labial fold was excessively deepened, and the nose, the lips and the chin were dark like the ring about the eyes. At times there were painful sensations of heat. Pulse very irregular. Respiration frequent and jerky, skin cold.

At 2 P. M. the rigor ceased. Temperature 102.°5. Pulse, 144. At 3 P. M. the patient asked for something to eat, which was given every two hours until 9 P. M. At 4 P. M., temperature 102°, at 6 P. M., 100°, with a pulse of 112. Through the night at three visits the temperature was 99.°5. The pulse became regular and the oppression in breathing ceased. The patient did not sleep, but she declared that she rested, as her head did not feel so empty. *The uterine hæmorrhage stopped entirely.*

April 22, A. M.—Pulse 108, temperature 99.°5. Takes considerable nourishment. Feels contractions in the lower part of the abdomen, like labor pains. Discharged 600 grammes of urine with a density of 1025, urea, 9, gr. 64, chlorides 3 gr. 90, phosphates 1, gr. 50. Slept well that night, perspiring freely.

April 23, A. M.—Temperature 99.°5, pulse 104, well nourished.

Microscopical examination of the blood showed a notable increase in red corpuscles, normal in form and nummular in arrangement, also a number of young hematies and the debris of destroyed red globules. The urine 325 grammes at 1026, contained urea 8 gr. 26, chlorides 2 gr. 58, and phosphates 0 gr. 67, was markedly green in color, and gave a carbolic acid reaction. The carbolized dressings were discontinued.

From this date (April 23) to April 26, the record is given fully, showing a progressive advance to convalescence. April 25, an enema was given, bringing away hard fœcal masses with much colicky pain. On April 26, the temperature was normal, pulse full but somewhat accelerated; 1320 grammes of urine, density 1023, urea 20.39, chlorides 19.14, phosphates 2.65.

The interesting points here are the immediate cessation of hæmorrhage after the transfusion of 100 grammes of blood, the marvelous rapidity with which a completely exsanguinated organism was relieved, and the perfect immunity of the operation itself.

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CHEESE—CAN IT BE RENDERED MORE SATISFACTORY AS AN ARTICLE OF DIET?—The *British Medical Journal* of June 14, in an editorial on "the dietetics of cheese," gives what seems to be a running abstract of a lecture by Mr. Matthew Williams, on the peculiarities of cheese as a food. The claim is made, consistent with general observation, that twenty pounds of cheese contains as much nitrogenous matter as sixty pounds of meat, and the reason assigned why it has not met with more general approbation is that it is not so easily digested. Then we are told that the reason why it is not easily digested is "because the salts of the milk were left in the whey when cheese was made with rennet. These, especially potash, were most necessary to assist digestion, and food which did not contain them should not be taken alone. Reasoning upon these two scientific truths, he had made a number of experiments as to various ways in which cheese might be made digestible. Casein itself was not indigestible, because it was taken with advantage by infants, and in milk there were two salts which were necessary to nutriment and easy digestion. His aim in the experiments he had performed, was to bring these constituents together, and see what nourishing and palatable foods could be made from them. By putting a sixth of an ounce of bicarbonate of potash with a pound of scraped cheese, and adding to them a small quantity of milk, he found them to dissolve and assume a liquid form. He used double Gloucester cheese in this instance, and the experiment was most successful. With American cheese it was not; and from this fact he was led to presume that double Gloucester cheese was made with rennet, as it ought to be, while the American cheese was not."

We do not intend to take up *seriatim* the various subjects referred to in the above extract. We have copied it in order that we may not do injustice to our contemporary. When we are told that the salts of the milk are left in the whey when the cheese is made with rennet we are led to infer that there is some other preferable way of making it without rennet, by which the desired salts are retained in the cheese. At the close of the extract we learn, however, as with the addition of the potash the double Gloucester dissolved, whilst the American cheese did not, the conclusion was that the "double Gloucester was made with rennet, as it should be, whilst the American cheese was not."

Now, as Americans we have been charged with a great many abuses; making wooden nutmegs, artificial eggs and the like, but it had never occurred to us that we were ever guilty of trying to find anything cheaper than rennet for the manufacture of cheese. We have nevertheless made some enquiries, and we find that the insinuation is as groundless as the reasoning is illogical.

We have to admit, however, that the charge made against the American factory cheese of insolubility is to some extent true, not, however, from the substitution of something else in the place of rennet as asserted, but by reason of a peculiarity in the mode of manufacturing. In American factories the milk to be made into cheese is always curdled with rennet. It is a peculiarity of the American factory system of cheese making that the curd is permitted to remain in the whey till the latter is distinctly sour. This greatly impairs the solubility and digestibility of the curd and cured cheese, by dissolving out more or less, according to the acidity, of the mineral matters of the curd, and carrying them off in the whey. But by far the greater part of the salts thus dissolved out consist of phosphates which are first converted into phosphoric acid, and lactates of the various bases, and then held in solution in the whey. The advantage which the manufacturer obtains from this procedure is a firm, solid cheese in a shorter time, and the disadvantage is felt by the consumer both in the inefficient assimilation, and in the development of dyspepsia and constipation with their associated evils, moral and physical. This, however, reacts with justice on the manufacturer, and diminishes the sale of an article that might otherwise be in much greater demand. Professor L. B. Arnold, of Rochester, N.Y., in his evidence before the Select Standing Committee

of the House of Commons at Ottawa, says: "It is rare indeed that any one can partake at all freely of such cheese (referring to the sour whey system), without soon suffering from its notorious tendency to constipation, and a general disturbance of the whole system. These effects are so uniform and frequent that people very naturally suspect they are the legitimate consequences of eating any cheese. This, however, is not so. It is only the effect of imperfect manufacture and curing. When properly made and cured, cheese is as healthy as other food, and can be as freely used by the average citizen, and even by invalids with impunity, and so far from having any constipating tendency, is rather a laxative." If these statements represent accurately the relation of the cheese question to the human economy, we trust that our hygienic workers will study the question for us who are consumers, and at the same time make the manufacturers realize that the common interest of both consumer and producer lies in the delivery of a readily digestible article. It is just as criminal to manufacture an article of common consumption carelessly, and thus injure the health of the community, as it is to adulterate an article with a baser product.

IMPORTANCE OF PURE WATER.—Chicago is supplied with water from Lake Michigan. It is taken two miles from shore and conducted to the city in tunnels. When unpolluted by sewerage the lake water is remarkably pure and pleasant. The sewerage of the city is, however, emptied into it through the Chicago river. In the spring, when the river is full, there is sufficient current to carry the sewerage far out into the lake, and when the wind blows from the south, the current is blown directly across the source of water supply. Except for a little time in the spring the river is so sluggish that the water would be motionless unless artificially moved. Some years ago it was found necessary to create an artificial current. In order to do this, two pumping works were established, one on each branch of the river. The river is somewhat Y shaped, the base of Y being the mouth, one branch running south and west and known as the south branch, the other north and west and known as the north branch. It divides the city into three divisions and forms for them an open sewer. Before the artificial current was created, the river during the summer months was a public nuisance. Now, so long as the current is maintained, the river remains salubrious. The pumps on the south branch transfer the water by way of the canal into the Illinois river. Those on the north branch empty it through a tunnel into the lake.

The pumps are made so that the water can be either pumped from the river into the lake or the lake water into the river. However, if a strong current is forced out of the river the water supply of the city becomes polluted. Therefore the south branch is emptied into the canal and the natural direction of the river current reversed. The water of the north branch is pumped into the lake and is now a source of pollution to our drinking water. The engineers say that the current can not be reversed while the south branch pumps are forcing the water out of the river into the canal without causing a stagnation of the water in the main river because of the contrary currents in the two branches.

On the south branch water is being pumped from the river at the rate of 60,000 cubic feet per minute. During the last year Professor J. H. Long, of the Chicago Medical College, has been making analyses of the hydrant and river water. He finds at State street bridge, which is about half a mile from the mouth of the river, seven parts of free ammonia per 100,000,000 of water, and sixty of albuminoid ammonia; at Polk street, about a mile further from the lake, on the south branch, seventy parts of free ammonia and fifty-two of albuminoid; at the pumping works two hundred and sixty parts per 100,000,000 of free ammonia, and one hundred of albuminoid. At the pumping works on the north branch there were two hundred and forty parts of free ammonia, and eighty-four of albuminoid. Professor Long says: "It is from this source that the lake receives its greatest contamination, for the pumps throw through the conduit into the lake of this vile stuff 16,000 cubic feet per minute. When the wind is favorable a dirty current can be seen floating from the outlet of the conduit toward the crib"[1] from which our drinking water is obtained. That this contaminates our water can be readily seen from the following figures. "During the week past daily tests show amounts of free ammonia ranging between two and eight parts per hundred million, and albuminoid between ten and sixteen parts per hundred million. The microscope reveals the presence of bacteria." Chemists usually consider three parts of free ammonia and five parts of albuminoid per hundred million of water as limits beyond which nitrogenous matter should not go. When the river is flooded in the spring after a general thaw, similar contamination is evident. Professor Long found a year ago in March, both free and albuminoid ammonia. "The amounts decreased from six to eight parts respectively per hundred million the 1st, to one and five per hundred million the 15th. However, in a few days the album-

[1] Chicago *Tribune*, August 3, 1884.

inoid ammonia increased again, and remained nearly double the above amount for a month. This year something similar was observed, and at both times the microscope showed not a few bacteria. The water tested was obtained from a hydrant in the laboratory of the Chicago Medical College on Twenty-sixth street."

If all our river water could be pumped away from the lake, it is evident that our hydrant water could be kept pure. This can only be accomplished, however, by keeping the pumps in action all the year round, and by ceasing to empty the north branch into the lake. The question then arises, how can the water of this portion of the river be disposed of? Perhaps the most economical and best way would be to irrigate the land near the present conduit. Immediately north of it are many of the truck gardens that supply the city with vegetables. It has been found abroad that this is both the most economical and most healthful way of disposing of sewerage water. The method of purification by land irrigation has, however, been but little tried in this country. Pullman, a suburb of this city, furnishes a good illustration of this system. The hydrant water should, however, at all hazards be kept uncontaminated.

PNEUMOTOMY.—With a view to ascertaining what conditions justify this operation, it may be well to recall some of the cases reported of late, although almost every medical journal of the past few weeks has mentioned them, and the particulars may be fresh in the minds of our readers. It is superfluous to repeat any portion of Professor Fenger's paper which appeared in this JOURNAL of the 19th ult., since its facts are accessible, if not well remembered. At the time of its presentation before the State Medical Society, Dr. Fenger's was the second successful case to date. But, at a May meeting of the Royal Medical and Chirurgical Society of London, Dr. Cayley and Mr. Pearce Gould detailed a case of acute circumscribed gangrene of the lung in a girl of twelve years in which the latter gentleman operated the 16th of last February, with recovery. Although not reported until after Dr. Fenger's, it antedated it by two months. Both surgeons were ignorant of the other's proceeding and employed different methods of operating. Mr. Gould punctured with a large trocar and canula, and inserted the drainage-tube through the latter. The result of both operations was the same, and justifies the procedure in this class of cases. At the same meeting reports were made of this treatment in pulmonary cavities; some, that proved to be bronchiectatic, and some, tubercular. In all marked amelioration of symptoms followed, but no recoveries.

In the *Lancet* of July 5, Mr. Teale, of Leeds, published an instructive case of "Abscess of Lung Cured by Incision and Drainage." This was in March, 1881. The convalescence dragged along for months, but recovery was so complete that when seen last June, the patient was "not conscious of being in other than the most perfect health, is actively at work in his profession every day, and has no discomfort or shortness of breathing during ordinary exertion."

The opening into and drainage of pulmonary abscess would therefore appear to be justified in certain cases.

It only remains to consider the propriety of paracentesis and drainage of pulmonary cavities, and the method to be employed.

It is unfortunate we have not access to the full text of Dr. Biss's paper, since it discussed the drainage of "Pus-Secreting Basic Cavities of Lung," and gave his reasons for dividing them into three classes:

"(1) Those in which paracentesis is imperatively called for; (2) those in which it is unjustifiable; (3) those in which it is a question of special difficulty whether it should be performed or not." The first class would include cases, we think, in which surgical aid is demanded by the gravity of the constitutional symptoms, due to profuse secretion of pus which is ineffectually expectorated and is contaminating the system by its absorption. It also presupposes the demonstration and exact location of a cavity.

The reverse of these conditions would constitute the second, while in the third, many considerations might make the question of operation difficult: The existence and location of a cavity might be doubtful, its size and the amount of expectoration, insignificant, though attended with profound general disturbance; the patient's previous history, bad; or bacilli might be found in the sputum, rendering the chance of ultimate recovery slight, etc., etc. In certain instances the mere amelioration of symptoms and prolongation of life might recommend the treatment. If the surgeon thought there was reasonable prospect of cure by granulation of the walls and a cessation of the unhealthy secretions, or still better of the obliteration of the cavity, as sometimes occurs in spontaneous recovery of circumscribed pulmonary gangrene, no one could well question the propriety of his opening it up and draining off its contents.

Although death occurred in Dr. Biss's case, he did not consider it caused, though hastened by the operation, (since, "the symptoms were considerably, but not wholly relieved,") but by cerebral abscess.

Let us now consider cavities of tuberculous origin. In the cases cited the introduction of the drainage tube was attended with evident abatement of the cough and expectoration, as might be looked for; the fever was also lessened, the appetite improved and strength was gained. None of the patients remained under observation long after the operation, but of course a cure was out of the question. It is improbable that tuberculous walls would heal, and if they should do so, would the progress of the constitutional affection be stayed? It would be curing a manifestation, not the disease itself. Gangrene and abscess are local diseases, and as such benefited by the operation. The drainage of tubercular *vomicæ* is but palliative, yet the surgeon must decide if the gain would warrant his interference.

The shock of pneumotomy does not appear to be very severe. At least the patients seem to have rallied from it without great difficulty.

Irrigation in addition to drainage is desirable, if it does not cause too distressing cough. However, in this regard each case appears to be a law unto itself.

Adhesion of the *pleuræ* at the point of puncture is a desirable, though not an essential condition, to the success of the operation. The existence of adhesions is often impossible of previous determination. Yet this fact should not deter the operation, since no evil results have followed where adhesions did not exist.

Fenger exsects a portion of rib, and leaving *in situ* as a director the needle of the hypodermic syringe, used in exploring, cuts along this with the galvano-cautery. The English Surgeons appear to prefer to puncture with a large trocar and canula. This seems objectionable for two reasons:

(1) There is greater danger of hæmorrhage.

(2) It is not always easy to penetrate the cavity at the first thrust, and it would be bad to repeat it with so large a trocar as is recommended.

Those among us who are conservative in their endorsement of this operation, except in gangrene and abscess, are not without reason. The method is new, and further experience may develop objections now overlooked in the ardor of enthusiasm. Time tempers enthusiasm and modifies the judgment.

AMERICAN PUBLIC HEALTH ASSOCIATION. — The Twelfth Annual Meeting of this important organization is to be held on Tuesday, Wednesday, Thursday and Friday, October 14–17, 1884, at St. Louis, Mo. The officers and executive committee are actively engaged in making all needed arrangements for a large and useful session of the Association. Special committees composed of active and eminent sanitarians are expected to report on the Management of Epidemics; on Vital Statistics; on Compulsory Vaccination; on School Hygiene; on Cattle Disease; and on Necrology. There will also be papers and discussions on many other subjects. We trust there will be a large attendance and a profitable meeting. The present active officers are: President, Dr. Albert L. Gihon, U. S. N., Washington, D. C.; Secretary, Dr. Irving A. Watson, Concord, N. H.; Treasurer, Dr. J. Berrien Lindsley, Nashville, Tenn.

PACIFIC MEDICAL AND SURGICAL JOURNAL.—We have received a circular announcing that the *Western Lancet*, of San Francisco, heretofore edited and published by Dr. Whitwell, has been united with its senior contemporary, the *Pacific Medical and Surgical Journal*.

The united journal is to be under the editorial charge of Dr. Gibbons, Sr., and Dr. Whitwell. The former is one of the pioneers of the profession on the Pacific coast, and has ably edited the *Pacific Journal* for more than twenty years. The latter has also given evidence of commendable industry and editorial ability. The new arrangement gives assurance that the profession on the Pacific coast will have one journal worthy of their cordial support, instead of two with a divided patronage insufficient for either.

EARTHQUAKE.—A very decided shock of an earthquake was felt throughout the greater part of the Eastern and Middle States of our country on Sunday, August 10, at 2:10 P. M. In New York City, the motion of the buildings was sufficient to cause the inmates to rush into the streets in great fright. The motion, accompanied by a rumbling sound, continued from two to five seconds. It was felt from Boston to the western part of Pennsylvania, and south as far as Baltimore and Washington. No serious damage was done to buildings anywhere.

CHOLERA.—The epidemic cholera continues to spread slowly in the south of France. It is moderately prevalent in the Provinces of Turin and Genoa, and in several towns in other parts of Italy. A dispatch from London Aug. 11, says that cholera is prevailing at Maufragne near Valence, and at Bezirs, with much violence.

YELLOW FEVER.—On the 11th inst. the British ship Deerfield, from Havana, was anchored off the mouth of the Mississippi river below New Orleans with yellow fever on board. The captain was warned not to enter the river, but to take his vessel and cargo to Ship-Island for sanitation.

DR. ERASMUS WILSON, OF LONDON.—The death of this eminent physician and author was announced in the secular papers of the 10th inst.

SOCIETY PROCEEDINGS.

MASSACHUSETTS MEDICAL SOCIETY.—PROCEEDINGS OF THE SUFFOLK DISTRICT MEDICAL SOCIETY.—ADJOURNED SPECIAL MEETING.

Section for Clinical Medicine, Pathology, and Hygiene.

ALBERT N. BLODGETT, M.D., SECRETARY.

(*Continued.*)

Mr. Desmond FitzGerald, C. E., said that the improved system of sewerage for the city of Boston was so designed that if it should ever be found desirable to utilize the sewerage, it could be done, but that in the present experience of dealing with as large a quantity of refuse water as that now supplied by Boston, and considering its highly diluted state, it would be a great waste of money to attempt any scheme of utilization. In regard to inland towns situated on the borders of water-sheds used for sources of water supply, the case was, however, far different. Here very small amounts of sewage had to be dealt with, and there was little doubt in his mind that some scheme either of filtration or irrigation could be successfully applied. The speaker did not intend to use the word success in a pecuniary, but in a sanitary sense.

Mr. FitzGerald proceeded to describe the actual condition at the present time of the several sources of supply of the city of Boston, and of his attempts to preserve the purity of the same. He showed that the time had now arrived when some principle of action must be assumed. Either the brooks must be given up to the the towns for common sewers or the towns must be made to take care of their sewerage in a proper manner.

The speaker went on to show that the brooks are now used for drainage only by those people who happened to own land on the margins, while the neighbors immediately adjoining have to provide for their sewage by emptying their cesspools, etc., and the hardship and injustice of this is not denied. Mr. FitzGerald described the works at Sherborne, which are sub-surface irrigation combined with intermittent downward filtration. He said the works had been very much misrepresented, and that while no filtration system removed the chlorine, yet the effluent water was clear and inoffensive to the eye or smell, and practically the filthy condition of the sewage is very materially improved. The speaker agreed with the statements made by Mr. Ernest W. Bowditch at the last meeting, that no cast-iron rule could be made to suit all cases, but that as the circumstances and situation of every town were different, so a study would have to be made of each case and that system adopted which best suited its peculiarities.

Dr. John G. Blake remarked that, looking at the subject from the health stand-point alone, it was becoming every day more necessary that some solution of the sewage question must be attempted if the health of communities as affected by their water supply was to be considered. What is wanted to hasten the solution of the subject is a law compelling towns bordering on rivers, ponds, and lakes to make some other disposition of their drainage than to allow it to run into these as receptacles. Up to the present time it has been impossible to convict offenders, but during the past winter a law, more stringent in character and free from the defects in previously existing laws, was passed, and under it, action to punish offenders will soon be commenced and pushed vigorously. From what had been said on the subject Dr. Blake is inclined to think that irrigation might prove itself very well adapted for small country communities without any regular system of drainage. The question of profit might well be left for later discussion, and the only point deserving consideration was the disposal of their sewage at the least expense and in such manner as to prevent its becoming a source of injury to themselves and others. Inasmuch as eighty cities and towns are moving to supply themselves with water, the importance of this subject had become very much magnified, and action looking to a remedy must soon be taken.

Dr. Barnes, in closing, said: If the theories advanced in opposition to the employment of irrigation and agriculture for the epuration of sewerage had not been used in Europe, and finally overcome by actual experience, one would hardly feel like continuing to advocate this system for Massachusetts. My enthusiasm, however, does not carry me so far as to suggest even a possibility of the abandonment of Boston's system of intercepting sewerage, notwithstanding the probability of its polluting the lower harbor and producing an unsanitary condition similar to that of the upper harbor, and annoyance to the people living on the south shore, for before this condition is reached it may fairly be anticipated that irrigation and agriculture will have proved here, as in Europe, an economical and practical method of epuration. The sewer can then be extended to the main land and discharged on the soil. "It will not be possible, however, to connect any territory adjacent to Boston with this system without constructing an additional tunnel under Dorchester Bay." This is the language of one of Boston's officials a few weeks since before a committee of the Legislature. Filtration has in numerous instances in Europe, accomplished a complete clarification of sewage, and yet the analyses show the effluent water to contain from one-half to six-sevenths of the original amount of polluting matter. Col. Waring's system of filtration at the Women's Prison accomplishes all that is possible, and yet the analyses show the result to be far from satisfactory. Pasteur and Shloesing, with others, sign a report to the Parisian government in which is stated, "the system of epuration by soil is the only one yet demonstrated to be a success. The discharge should be intermittent, and with methodical rotation, and the doses should be determined by analyses of the effluent water."

At Dantzic is encountered a mean winter temperature about that of our own. Irrigation is continued throughout the year with quite as much success in epuration in winter as in summer, and at all times without offense.

The "winter basins" at Breslau are not a part of the system advocated, as they involve the stagnation of sewage.

"The rosy coloring" of the Gennevilliers farms was not my own painting, but the translation of a report by a commission appointed by the city government of Paris, to whom, it seems to me, ought to be accorded the credit of knowing the facts, particularly as the report was unanimously signed. These gentlemen say "the increase in valuation and population at Gennevilliers is due to farmers coming from other parts of France to share in the general prosperity." Durand-Claye says "the population of Gennevilliers has increased thirty-four per cent. in five years by the arrival of numerous cultivators." M. Joly says of the Gennevilliers farms: "The question, scientific and practical, is absolutely solved." And Dr. Loiseau, at the Geneva Congress, in 1862, said "the benefits derived from these farms are indisputable from every point of view."

I was amazed at the statement that no person knew the cost of the Gennevilliers farms, as I have in my library an official document of Paris pretending to give every item of expense from the first experiment at Clichy, in 1866 and 1868, down to 1881, including lawsuits and large indemnities paid for an unfortunate experiment.

In regard to the city of Pullman making arrangements to pump the sewage into the lake I have the following letter from the superintendent of the farm:—

RIVERDALE, COOK COUNTY, ILL., *May 9, 1884.*

DEAR SIR.—If any such arrangements as you speak of in yours of 6th inst. are being made, I have no knowledge of the fact. The sewage is thoroughly purified by filtration, creating neither offensive odor nor nuisance of any kind.

The farm, last year, paid over six per cent. profit on the money invested ($80,000), and we hope this year to do even better. Consequently there exists no necessity for any such change as you speak of.

Very respectfully, E. T. MARTIN, *Superintendent.*

HENRY J. BARNES, M.D., BOSTON, MASS.

It should be mentioned here that downward intermittent filtration is a valuable auxiliary to sewage farming. I. Bailey Denton has written considerable upon this branch of the subject. I regret not knowing the history of the Pullman farm, as I should like to pay a proper tribute to the pioneer of this system in America.

The unprofitable results of sewage farming have been dwelt on by most of the opponents of the system, forgetting that it is a question of sanitation and not of making money; and if raising vegetables contributes in any degree to lessening expenses, it takes precedence, in a financial point of view, of all others, as they make no return for the original outlay, except the almost universal offense they create.[1]

It has been a long and costly struggle to demonstrate the fact that sewage can be epurated by irrigation and agriculture. Every conceivable danger has been predicted. And many are the unfortunate and disastrous experiments which can be cited as swelling the cost above the possibility of many of the farms earning interest on the plant. To obtain an act of Parliament authorizing the establishment of a sewage farm, often requires the expenditure of £10,000. Litigation and land damages, another large amount, for land is very dear in England. The heavy clay soil demands a large expenditure for drainage. But notwithstanding these obstacles the number of farms has rapidly increased, until now there are at least two hundred.

The Royal Commissions recommend the enactment of a general law authorizing farms of this character.

In 1876 Messrs. Chesbrough, Lane, and Dr. Folsom, Commissioners, reporting on the sewerage of Boston, say "the Edinburgh farms are profitable." One of the commissions appointed by the Parisian government declares the sewage farms at Gennevilliers profitable, and uses this as one of the arguments in support of their recommendation to the city to purchase the State lands in the forest of St. Germain. The owner of the farm at Leamington (which, by the way, has not been leveled), as well as the superintendent of the farm, claim a good profit after paying the city $2.250 per year for delivering 1,000,000 gallons each day at the highest point of the farm.

Mr. Aird could not have lost a large amount of money in his contract to take the sewage of Dantzic, for some years later he made a similar contract with the city of Breslau. But it ought not to be required of the friends of this system to show profit until at least one system is devised capable of competition with this in producing satisfactory epuration.

(*To be continued.*)

[1] It would hardly seem necessary to affirm before a scientific body of men that clarification is not purification, or that no system of epuration of sewage is satisfactory, which, by analysis, shows quite as much pollution in the effluent as in the influent water. (See analysis of the sewage of the Women's Prison.) As to the average rain-fall of Great Britain, the figures quoted were obtained in the office of the United States Signal Service, and from Professor Niles. But as it is more a question of average humidity which determines the evaporating power, a few inches more or less of rain-fall per year is of little consequence.

FOREIGN CORRESPONDENCE.

LONDON LETTER.

FOR THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION.

LONDON, July, 1884.

Dr. Morell Mackenzie, of throat celebrity, has published a pamphlet on the subject of hay fever. The information is exhaustive. Hay fever, it seems, like influenza and cholera, did not occur in Europe in ancient times. Bostock, in 1819, first described it; Elliotson did so in 1831, and after him Phœbus, of Giessen. Helmholtz gave his views in 1869, and he was followed by many others. Dr. Morell Mackenzie considers the pollen of certain grasses to be the exciting cause. Dr. Mackenzie differs from the great Helmholtz in the importance which he assigns to quinine. He recommends with the utmost confidence, valerinate of zinc in combination with assafœtida in pills of one grain of valerinate of zinc and two grains of compound assafœtida pill, doubling the dose at the end of ten days or a fortnight. He also alludes to tincture of benzoin in hay asthma, and recommends an inhalation of benzoin, together with an in-

sufflation for nose of powdered $^1/_{16}$ of a grain of morphia and one grain of bismuth.

News has just been received of the death of Dr. Hunter, of missionary fame. He was the first medical missionary to China of the Irish Presbyterian Church. He died on board steamer returning home. Death resulted from consumption.

Another new and important application of salicylic acid has come to light in the medical world. Dr. Ogilvie, of the Aberdeen Royal Infirmary, having lately had a patient present himself suffering from a peculiar affection of the dorsum of the left foot. The whole of the anterior half of the foot was brown, rough and warty-looking, in fact, not unlike the hide of a hippopotamus. On attempting to detach a small portion, bleeding followed. The disease had existed for two months, and was spreading. Having procured some of Beiersdorf's salicylic plaster, to which Dr. Thin directed special attention at a late meeting of the London Clinical Society as used by Dr. Unna, of Hamburg, in the treatment of cases of thickened epithelium, a certain quantity of the plaster being cut into strips, the affected part of the foot was accurately strapped with it. The dressing was left untouched for three weeks, and on removing it the warty layer came off with the plaster, and a fine, soft, healthy skin was found covering the parts previously diseased. At some points the skin was covered with a thick layer of white, softened epithelial matter, resulting from the peculiar solvent effect exerted by salicylic acid on the epidermic tissues. One or two small warty portions about the roots of the toes had not been covered with the plaster. An attempt to scrape off this warty tissue, first by means of the finger nail, and then by a blunt lancet, was attended by bleeding. To these parts fresh strips of salicylic plaster were applied, and when in ten days they were removed, the skin underneath presented a normal appearance. The results so far have been so satisfactory that Dr. Ogilvie is going to give this novel mode of treatment an extended and careful trial, as there appears to be a wide field of useful application for so simple and efficacious a method for the removal of morbid conditions of the skin. In due course the profession may expect some interesting details of the cases in which the new plaster is employed.

A case has been reported in which a papilloma situated on the sole of the foot was cured by applying to the tumor a Chanteand granule of salicylic acid by means of a few strips of plaster. The perspiration of the foot dissolved the granule. After this method had been carried out some 20 times the foot was well.

The fourth Masonic lodge founded on the principles of total abstinence, has just been consecrated in London, Dr. W. B. Richardson being Worshipful Master. Amongst the officers are Dr. Beauthwaite, Dr. Quintin Hogg and Dr. N. Kerr. In response to the toast of his health, the well-known sanitary reformer said that if the great principles of Freemasonry were to be carried out to their fullest extent, universal peace, permanent progress, and the brotherhood of humanity, it must be by the adoption of the principles they professed.

The Home Hospital Association have subscribed an additional £10,000 for the purpose of acquiring the adjoining premises of their Fitzroy Hospital, Fitzroy Square, and erecting there and furnishing buildings which will double the accommodation of that flourishing institution. The Home Hospital movement originated in a letter written to the "*Standard*," by M. H. G. Burdett, on April 4, 1877, in which he advocated the formation of an association for the purpose of founding hospitals and convalescent institutions, which should be replete with every possible comfort and provision for the privacy and proper treatment of well-to-do patients, and to which admission should be by payment alone. In consequence of the publicity thus obtained, articles in support of the movement were published in the medical and other newspapers. The Association provides hospital treatment, skilled nursing, and other accommodation, for the benefit of all classes who can afford to pay for such advantages when attacked by illness.

The city Commissioners of Sewers, by the courtesy of Sir Henry Thompson, Sir Spencer Wells, and other members of the Cremation Society of England, have made a visit to the Society's Crematorium at Woking and observed the cremation of a horse. The committee thought it was inexpedient to erect any apparatus for the cremation of the dead, until that mode of disposal has been regulated by Parliament. The bill which was introduced into the House of Commons, with a view to regulate the proceedings in cremation of the dead, has for the present been rejected by a small majority.

At a conference held at the International Health Exhibition, Dr. W. H. Horfield read a paper on "How Infectious Diseases are Caught." He thought the atmosphere was the most universal medium of communication, though some poisons were more readily conveyed in this manner than others. Poisons of several diseases might be conveyed by means of clothing, and laundries were often the agencies of dissemination. An instance was given where chickenpox had been communicated by means of letters. Drinking water was a most important vehicle for the conveyance of enteric fever, with cholera and dysentery in hot climates, and diphtheria might be spread in this way. Some cases were also given where flies must have conveyed the poison of infectious diseases.

Prince Ferdinand, of Bavaria, brother-in-law to the Duke of Genoa, having published a work with the title "The Anatomy of the Tongue and Studies in Comparative Anatomy," has just received from the University of Munich the honorary degree of Doctor of Medicine.

Geologists of eminence report that within a short time of the shock of earthquake, which in the spring devastated a part of the county of Essex, the level of the water in the wells rose five feet above the highest level ever known. On the Sunday after the shock the water had risen to eight feet, and it has since remained at a rise of seven feet.

G. O. M.

NECROLOGY.

FREEMAN, WILLIAM, M.D., the subject of this notice, was born near Lockport, in the State of New York, in 1809, where he received his literary and professional education, and graduated in the Geneva Medical College in 1834. After graduating, he practiced with his preceptor for four years, and then came to the West and located in Hamilton, Butler Co., Ohio. Here he was married, and practiced his profession until 1847. He then removed to Camden, Jay Co., Indiana, where he continued in active practice until the day of his death, April 17, 1883, being 75 years old lacking 11 days.

Dr. Freeman served three years in the army during the late war, one as Assistant-Surgeon of the 53d Ind. Vol. Inf., and two years as Surgeon of the 7th Ind. Cavalry, under Gen. J. P. C. Shanks. He became a member of the Grant County Medical Society on the 8th of June, 1850, many years before there was any society organized in his own county. He was one of the organizing members of the 11th Congressional District Medical Society, which passed appropriate resolutions of respect for his memory, an active member of the Indiana State Medical Society, and at the time of his death President of his own county society.

Dr. Freeman was a diligent student and an active, energetic practitioner. By keeping up with the advancing improvements of the day, he always maintained a prominent position in his profession.

He was intolerant of sham devices and false pretenses as substitutes for the merit of real knowledge and scientific attainment in the profession.

In his death the profession lost an earnest member, who was ever ready to give his aid and influence to any measures calculated to promote the usefulness of his calling, and the community the services of a true man and an honorable physician.

His death was caused by an encysted tumor of the brain. It was sudden and unlooked for at the time. He had occasionally suffered from vertigo and cerebral symptoms for some 18 months prior to the fatal termination, but was able to attend to the duties of his profession up to the day of his death. Material for this notice was furnished by a son of the deceased, B. R. Freeman, M.D. L.

MISCELLANEOUS.

MEMORIAL TO THE LATE DR. AMBLER, U. S. NAVY.

The officers of the Medical Corps of the United States Navy some months ago determined to erect an appropriate memorial to their late associate, Dr. Ambler, and after a conference of views it was decided to commemorate him by a granite monument on the lawn in front of the U. S. Naval Hospital at Norfolk, Virginia, and a bronze tablet to be placed in Leeds church, near his home, at Amblerville, Fauquier county, Va., where he has been buried.

The committee to whom this work was intrusted, and of which Dr. Edward Shippen, of the U. S. Naval Hospital at Philadelphia, is chairman, have just completed this tablet, which will soon be placed in the church. It bears the following inscription:

JAMES MARKHAM AMBLER,

PASSED ASSISTANT SURGEON UNITED STATES NAVY.

Died on the banks of the Lena River during the memorable retreat of the ship's company of the U. S. Arctic steamer Jeannette, in the year

1881.

His sense of duty was stronger than his love of life.

In memory of his noble example and heroic death this Tablet is erected by the Medical Officers of the United States Navy.

OFFICIAL NOTICE.

ANNUAL DUES from members of the Association—*Five Dollars* per annum—are payable directly to the Treasurer. Such payment entitles them to receive the JOURNAL of the Association for one year.

SUBSCRIPTIONS TO THE JOURNAL from those who are not members should be forwarded to the office of publication, Chicago.

BACK VOLUMES OF THE TRANSACTIONS may be procured, at reduced rates, by addressing the Treasurer.

THE INDEX to the 33 Volumes of Transactions will be forwarded, postpaid, on receipt of *One Dollar* by the Treasurer.

According to a resolution passed May 9, 1884, at the Washington meeting, continuous payment of Annual Dues is required, to retain permanent membership.

RICHARD J. DUNGLISON, M.D.,
Treasurer.

Lock Box 1274, Philadelphia, Pa.

LIST OF OFFICIAL CHANGES IN THE MEDICAL CORPS OF THE NAVY, FOR THE WEEK ENDING AUGUST 9, 1884.

Assistant Surgeon J. S. Sayre, ordered to U. S. S. "Independence."

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT UNITED STATES ARMY, FROM AUGUST 2, 1884, TO AUGUST 8, 1884.

Woodward, Jos. J., Major and Surgeon, sick leave of absence extended six months. (Par. 9, S. O. 178, A. G. O., July 31, 1884.)

Gibson, J. R., Major and Surgeon, granted leave of absence for 1 month and 16 days. (S. O. 36, Hdqrs. Div. of the Atlantic, August 4. 1884.)

Heizmann, C. L., Captain and Assistant Surgeon, relieved from duty at Columbus Bks., Ohio, and ordered for duty in Dept. of the East. (Par. 2, S. O, 186, A. G. O., August 2, 1884.)

McCreery, Geo., 1st Lieutenant and Assistant Surgeon, leave of absence extended two months. (Par. 4, S. O. 180, A. G. O., August 2, 1884.)

Taylor, A. W., 1st Lieutenant and Assistant Surgeon, ordered for temporary duty at Fort Riley, Kans. (Par. 1, S. O., 153, Hdqrs. Dept. of the Mo., July 29, 1884.)

Hopkins, W. E., 1st Lieutenant and Assistant Surgeon, granted 1 month leave of absence, with permission to apply for 1 month's extension. (Par. 1, S. O. 67., Hdqrs. D. of Arizona, August 1, 1884.)